

THE PROBLEMS OF IMPLEMENTING A 911 EMERGENCY TELEPHONE NUMBER SYSTEM IN A RURAL REGION

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16. Abstract <p>A "911 system" is a system which uses the telephone number "911" to summon emergency services. The concept of one universal emergency number to call a centralized reporting center where the appropriate emergency service may be dispatched has great intuitive appeal.</p> <p>Three facts should be kept in mind when evaluating the potential benefits of 911. First, alleged benefits of a 911 system in a predominantly urban environment should not automatically be assumed to exist in a rural environment. Second, it is quite possible that the benefits of a 911 system can be provided at lower cost in a system that does not incorporate 911 as the entry mode. Third, the benefits of a 24-hour answering center capability can be obtained without a 911 system.</p> <p>Using the Capital Area Planning Council (CAPCO) region as an example of a typical rural area the problems of implementing a 911 system are explored. The report concludes that the potential benefits of a 911 system would be best recognized in a predominantly urban environment. A region-wide 911 system may be difficult to defend, but depending upon the costs it seems that at least certain areas of CAPCO could benefit from a modified 911 system. A proposal for implementing a 911 system in CAPCO is evaluated. The report further recommends that each county should appoint a task force to consider the problems and opportunities that a 911 system presents for the county.</p>					
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EXECUTIVE SUMMARY

INTRODUCTION

A "911 system" is a system which uses the telephone number "911" to summon emergency services. By dialing "911" a citizen is assured that he has reached a centralized emergency reporting center that can marshall the appropriate emergency service (i.e., fire, police, ambulance) to respond to his need. The concept of one universal emergency number to call has great intuitive appeal. In fact, the state governments of New York, California and Massachusetts have passed laws requiring implementation of 911, and other states are likely to follow. The Federal government is also encouraging the implementation of 911 by making it a prerequisite for obtaining certain Federal funds.

The implications of requiring such a 911 system in rural areas is investigated in this report. The Capital Area Planning Council (CAPCO) which consists of the ten-county region surrounding Austin, Texas is used as the basis for this study. With the exception of Austin, the region is typical of rural America.

PROBLEM STUDIED

Many public officials and most citizens do not appreciate the very real difficulties inherent in providing a 911 system, particularly in rural areas. To many it seems just a simple matter of asking the phone companies to free the 911 digits and route the calls to the appropriate emergency service. This report describes the extent of such problems as toll calls (i.e., 1 + 911), ninth level sensing capability, and non-congruence of political, emergency service and phone company boundaries. Alternatives to a strict 911 concept are also investigated.

RESULTS ACHIEVED

The study resulted in 911 system recommendations for the CAPCO region in general and Bastrop County in particular. The 911 proposal recommended for CAPCO contains the following four activities:

- (1) Implement a 911 system in Travis County with the Austin Police Department dispatch room as the central answering center.
- (2) Start initial 911 feasibility studies and planning activities in each of the other CAPCO counties on a county-wide basis. During this phase special emphasis should be placed on developing 24-hour access to emergency services. In addition, the possibility of establishing a widely publicized seven digit number and a central answering center should be thoroughly explored.
- (3) Encourage individual communities to implement 911 if local conditions warrant.
- (4) Areas for which a 911 system may be currently economically or administratively infeasible should continue to monitor the progress of other communities in CAPCO to benefit from ideas that could improve their present method of providing emergency services.

In evaluating a proposal for a 911 system for Bastrop County, a typical rural CAPCO county, the report concludes that Bastrop County should not implement a 911 system at this time. Instead, it is recommended that Bastrop County undertake the following:

- (1) Establish and/or improve 24-hour-a-day response capability for police, fire, and ambulance services.
- (2) Undertake campaigns to increase public knowledge of local emergency telephone numbers, perhaps to include information stickers for each phone in the county. Public phones/booths along highways should be marked to include the location of the nearest access road.
- (3) Encourage the use of the telephone operator if there is any doubt at all concerning the proper agency or number to call.
- (4) When the 24-hour-a-day reporting center is established in Bastrop City, give wide publicity to both its existence and its telephone number.
- (5) After Bastrop County has had more experience with the problems inherent in a centralized emergency reporting center, it should further evaluate and perhaps implement a county-wide 911 system.

UTILIZATION OF RESULTS

This report has already been used as a basis for evaluating a

proposal for implementing a 911 system in Williamson county, another rural county in the CAPCO region. In addition, the report is being used as a basis for evaluating a bill before the Texas State Legislature to require implementation of 911 state wide. This report should be of interest to planners, legislators and the Federal government because it describes the real difficulties and costs of requiring a universal emergency phone number for all regions of the country. The report also contains guidelines for the planning and implementation of 911 systems.

CONCLUSION

Bell telephone, which serves approximately 80 percent of the phones in the United States, announced in 1968 that it would make 911 available nation-wide, yet only about 10 percent of the citizens in this country are covered by a 911 system. To help stimulate local initiative, the state governments of New York, California, and Massachusetts have passed laws requiring implementation of 911 and several other states are likely to follow. The Federal government is also encouraging the implementation of 911 by making it a prerequisite for obtaining certain Federal funds. The report concludes that each county government should appoint a task force to consider in detail the problems and opportunities that a 911 system presents for their county. Such a task force would avoid the problem of accepting a system largely imposed by others that might operate at a level of efficiency far below what it could have been if greater efforts had been exerted at the local level to detect and help alleviate potential problems.

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PREFACE

Recent legislation requires the implementation of a 911 telephone number system before funds can be received under the Emergency Medical Services System Act of 1973. This report utilizes a case study approach to ascertain some of the problems involved in such a task in a rural region. The region examined is the Capital Area Planning Council (CAPCO) region, a 10-county area surrounding Austin, Texas. The overall conclusion to be drawn from the study is that in a rural region, as opposed to an urban area, very different, and apparently more severe, problems occur in the implementation of a 911 system.

This document is based upon a professional report submitted as partial fulfillment of the requirements for the degree of Master of Business Administration at the University of Texas at Austin, prepared under the supervision of Dr. James A. Fitzsimmons. The author sincerely appreciates the enthusiastic support and guidance of Dr. Fitzsimmons in this effort. The author is also indebted to Southwestern Bell Telephone Company and gives special thanks to Mr. John Thompson and Ms. Yolanda Delgado for their totally unselfish aid, spirited cooperation, and remarkable patience.

The contents of this report reflect the views of the author, who is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Department of Transportation. This report does not constitute a standard, specification, or regulation.

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CHAPTER I

INTRODUCTION

Late in 1973 the United States Congress passed the "Emergency Medical Services Systems Act of 1973." According to this act, in order to receive Federal funds for its emergency medical services system, CAPCO must:

join the personnel, facilities, and equipment of the system by a central communications system so that requests for emergency health care services will be handled by a communications facility which....(II) utilizes or, within such period as the Secretary prescribes, will utilize, the universal emergency telephone number 911.¹

Thus there is a clear need for CAPCO to devise a 911 system so that this region can benefit from these Federal funds. This report provides the foundation for each of the following: a better understanding of a 911 system, detailed future studies, local 911 organizational and publicity efforts, and the design of a plan for a 911 system that will effectively serve the CAPCO region.

This report introduces the broad topic of 911 emergency telephone number systems and then focusses on the planning for and implementation of such a system for the CAPCO region. Time does not permit the detailed discussion of all the issues and problems associated with the implementation of a 911 system, but every attempt is made to at least point out issues deserving special consideration or further study. The recommendations and observations of the author are based on his reading of the currently available literature, somewhat limited data on the CAPCO region, and discussions with planning and telephone company officials and further analysis by others may indicate that major changes in the conclusions reached by the author are justified.

Realizing that many readers may be interested only in one or two

¹Public Law 93-154, 93rd Congress, S. 2410, November 16, 1973, Section 1206.

chapters of this report, each chapter is written basically as an independent unit. Internal transitions from one chapter to the next will generally be omitted, and each chapter will have an introduction and overview. In this fashion, it is hoped that the framework of the report will provide a sense of direction and flow for readers of the entire report, while the "unit approach" to each chapter will provide rapid access for those who may desire specific information. Following is a brief description of these chapters:

Chapter II -- The Concept of 911

The reader will be introduced to the concept of a 911 system by highlighting its definition, development, advantages, disadvantages, and possible system features. The ultimate value of a 911 system must be determined in light of the available alternatives for summoning aid, so a brief evaluation of the two telephone oriented alternatives - using the standard seven digit number and dialing the operator - will be included.

Chapter III -- Survey of CAPCO Region

The design of a 911 system for the CAPCO region must start with an appreciation of the geographic and demographic characteristics of the ten-county area. Following a brief analysis of these characteristics, a presentation of the currently available law enforcement, ambulance, and fire services will be made. A key consideration in the eventual structuring of a 911 system is the area served by the individual telephone companies in the CAPCO region. For this reason a survey of existing telephone service areas is included.

Chapter IV -- 911 for CAPCO - Preliminary Considerations

The following considerations for the implementation of a 911 system in the CAPCO region will be discussed: potential benefits, criteria for evaluation of the proposed systems, cost of the systems, who will pay for the system, and obstacles hindering implementation.

Chapter V -- System Proposal

A proposal by the author for the implementation of a basic 911 system in the CAPCO region will be presented with emphasis on alternatives rejected and the degree to which the proposal meets the criteria derived in Chapter IV.

Chapter VI -- System Proposal - Bastrop County

To provide a more concrete presentation of the considerations proposed in Chapter V, an analysis of a possible 911 system for Bastrop County will be made.

Chapter VII -- Implementation Activities

The success of a 911 system requires careful planning and phasing of required initial activities such as preparation of operator checklists, publicity campaigns, and training of operators. The improvement and continued success of a 911 system requires that many functions be performed in an on-going basis. These initial and continued activities will be addressed.

CHAPTER II

THE CONCEPT OF 911¹

The purpose of this chapter is to introduce the concept of a single emergency telephone number system. The value of a 911 system is discussed with emphasis on its contribution to more rapid provision of emergency services compared to dialing the operator or contacting the emergency agency using the standard seven digit telephone number.

911 Systems

A "911 system" is a system which uses the telephone number "911" to summon emergency services. The exact nature of the emergency services provided as well as the question of direct versus indirect (relayed by operator) access to the emergency services is not considered in the definition of a basic 911 system. Nor is it implied that the use of a 911 system will remove the need for standard seven digit telephone numbers. All that is implied is that by dialing 911 a citizen will reach a centralized emergency reporting center. Ideally it is envisioned that all local emergency services will join the 911 system, although some areas have included only the police in their 911 system.

Development of Single Emergency Telephone Number Overseas. In England and Ireland a single number emergency telephone system has been in existence for over 25 years. In these countries the dialing of "999" lights up a designated light on the operator's switchboard, and after the operator responds to the call it is routed to the appropriate agency. Similar systems exist in other European countries such as Belgium ("900"), Denmark ("000"), and Sweden ("90000").

¹Much of this chapter broadly parallels the discussion in General Telephone Company's 911 Universal Emergency Telephone Number With ALI (June, 1972).

The significant fact in all these systems that have proven effective over the years is that the calls all come into a centralized emergency reporting center of some type, irrespective of who has the responsibility for manning the center.²

Development of Single Emergency Telephone Number in the United States.

Although the idea of a single universal emergency phone number for the United States had been often expressed in the past, it was the President's Commission on Law Enforcement and Criminal Justice that provided the first official impetus towards such a system when it recommended that a "single number should be established"³ for reporting emergencies. Shortly thereafter, in 1968, the American Telephone and Telegraph Company announced that it would make the number "911" available nationwide for use as an emergency telephone number. Further official support for a nationwide 911 system came in 1972 when the:

Office of Telecommunications Policy, Executive Office of the President, issued a national policy statement which recognized the benefits of 911, encouraged the nationwide adoption of 911 by 1977, and provided for the establishment of a national information center on 911.⁴

The first 911 system established in the United States was put in by an independent phone company for Haleyville, Alabama, (population 3,740) in early 1968. Since then, 911 systems have increased to where over 24 million Americans in 321 communities can obtain emergency aid by dialing 911.⁵

911 and CAPCO Progress to Date

As of January 1974 all ten counties that comprise the CAPCO region

²General Telephone, op cit., p. 7

³The Franklin Institute Research Laboratories, 911, A Handbook for Community Planning, (October, 1972), ii.

⁴The Franklin Institute Research Laboratories, op. cit., p. ii.

⁵Sgt. John Connolly, Police Communications Division, New York City Police Department, interview on Today NBC-TV program of January 7, 1974.

had passed resolutions stating their intention of participating in an area-wide system of emergency services to include "the probable establishment of a universal emergency number such as 911."⁶ Initial contact was made with Southwestern Bell Telephone Company in March 1972,⁷ but to date not much else has been done to further the development of a 911 system for the CAPCO region.

The passage of the 1973 Emergency Medical Systems Act by the United States Congress directly ties the availability of Federal funds to the eventual existence of a 911 universal emergency telephone number system. Thus, if the CAPCO counties wish to share in Federally granted emergency medical service monies (as is implied by the resolutions passed by the counties and towns in CAPCO), it is essential that plans be developed for at least a basic 911 system.

911 System Options--Basic and Modified

Many public officials and most citizens do not really understand what constitutes a basic 911 system nor are they aware of the options now available or being developed by the communications industry that can be used in a 911 system.

Basic 911 System. All 911 calls in a telephone central office are routed to a central answering point.

Automatic Call Distributor (ACD). The ACD is a device that automatically distributes incoming calls to the available (i.e., not busy) operator positions in a 911 communications center. For example, the ACD for New York City's 911 system distributes calls to 48 operator positions in the central communications room in downtown Manhattan.⁸

⁶See the Appendix for an example of such a resolution. In this writer's opinion, most of the governing bodies in CAPCO were not aware of 911 costs and were not concerned with them since it appeared that the funds would come from HEW.

⁷L.D. Associates, Emergency Medical Services System, Appendix XI, Telephone "911", a technical proposal for the CAPCO.

⁸Richard C. Larson, "Improving the Effectiveness of New York City's 911," Drake, Keeney, and Morse, Analysis of Public Systems, The MIT Press, Cambridge, Massachusetts, 1972, 153.

Called Party Hold. This feature enables the called party to hold a line open even after the caller has hung up. Crank or nuisance calls can be traced and contact reestablished with a party who has provided incomplete or inaccurate information. The current state of the art limits this feature to those lines with direct trunking (i.e., direct wire connections) to the answering center.

Ring Back. The ring back feature is similar to called party hold and has the same advantages and direct trunking limitations.

Forced Disconnect. With forced disconnect the answering center can free a line even if the calling party fails to hang up. This feature is part of the basic system provided by Bell Telephone.

Identification of Incoming Lines. When a 911 answering center handles calls from two or more central telephone offices, it is possible to color code or otherwise indicate the lines from each central office. In this fashion the answering center can get a rough approximation of the geographic area from which the call is originating.

Automatic Number Identification (ANI). An ANI system enables the telephone operator to identify the telephone number of the phone being used by the calling party. This feature enables the telephone operator/emergency agency to reestablish telephone contact with the caller should additional information be required. It is also hoped that it will help reduce crank calls. This capability currently exists only in direct-distance dialing.

Calling Number Identification and Location (CNIL). Still in the development stage, this feature will display the phone number and address of the phone location on a panel in front of the operator.

Dial-Tone First Pay Phones. This scheduled improvement by the Bell System will enable users of pay phones to reach a 911 reporting center without first depositing a coin.

Selective Routing. This feature, which is still in the development stage, will identify the address of a calling party and route his call automatically to the proper political jurisdiction regardless of the telephone central office boundaries.

Dedicated Trunking. A phone line connecting two points that handles only calls between those two points.

As this list of possible variations and components of a 911 system suggests, individual communities can enjoy substantial flexibility in the design and operational capabilities of a single number emergency telephone system.

Alternatives to the 911 System

There are many technologically feasible means of summoning emergency aid, but at the present time the telephone is the most economical and accessible. For this reason the only alternatives considered in this section are telephone-oriented.

Present Seven Digit System. A glance at the inside cover of any local phone directory will provide an indication of the array of telephone numbers that exist for obtaining emergency aid (See Appendix). Contributing to the large number of seven digit listings are the following: the many types of emergency services available, the limited jurisdiction of the providers of such services, and the nonexistence of 24-hour-a-day seven-day-a-week response capability for certain services. The time spent in locating the proper number and eventually reaching an agency that can provide the desired emergency service can be critical. The use of seven digit numbers assumes that the caller is physically and emotionally able to locate both a directory and the proper phone number. This assumption may be invalid for certain individuals (e.g., blind, illiterate, or mentally retarded), for certain phone locations (e.g., dark locations or no directory available), persons rendered hysterical by emergency situations, or the particular emergency (e.g., prowler at night or raging fire). In desperation the caller may turn to calling the operator.

Dial the Operator. There are many problems inherent in an emergency communications system that relies heavily on the telephone operator as the initial contact with that system:

- (1) The telephone operator may not be adequately trained to elicit all the required information from the caller.

- (2) In many instances the operator will have to look up the appropriate number, in effect transferring much of the "look up" delay from the caller to the operator.
- (3) The operator serves as either a relayer of information or a transferer of calls, both of which add to response time.
- (4) The operator has other duties that may cause some delay in responding to emergency calls. (The operator presently has no means of distinguishing an emergency call from a routine call before she responds to the call.)
- (5) Presumably the average telephone operator would have more difficulty than a 911 operator in distinguishing between true emergency and nonemergency situations. Thus, theoretically, more unnecessary calls would reach the action agencies under a telephone operator system than with a 911 system.
- (6) In many instances the appropriate number to call or agency to contact may change, (i.e., day versus night and weekend versus weekday), and it would be more difficult for all the operators to be aware of these peculiarities than it would be for specially trained 911 operators.
- (7) Operator turnover (fifty to sixty percent a year)⁹ further adds to the lack of experience of the typical operator staff.

Advantages and Disadvantages of 911

The key factor in evaluating a 911 system is the improvement in response time. Most evaluations of the three telephone oriented systems (911, seven digit numbers, and dial the operator) generally do center on response time, but there is no uniformity in the definitions of "response time". Some studies define response time as the time between the completion of dialing an emergency agency's number and the answering of that call by the agency. Others prefer that the time start when the phone is first picked up by the caller. A more meaningful definition of response time would take as its starting point the instant that a citizen perceives the need for emergency aid and would end with the arrival of that aid. Thus, the total telephone emergency response time could be viewed as a system with three major components: input, transfer, and dispatch (See Figure 1). Viewed in this light, the advantages of a 911 system can be categorized as follows: reduction of input time, reduction of transfer time, and miscellaneous.

⁹The Franklin Institute Research Laboratories, op. cit., p. 19.

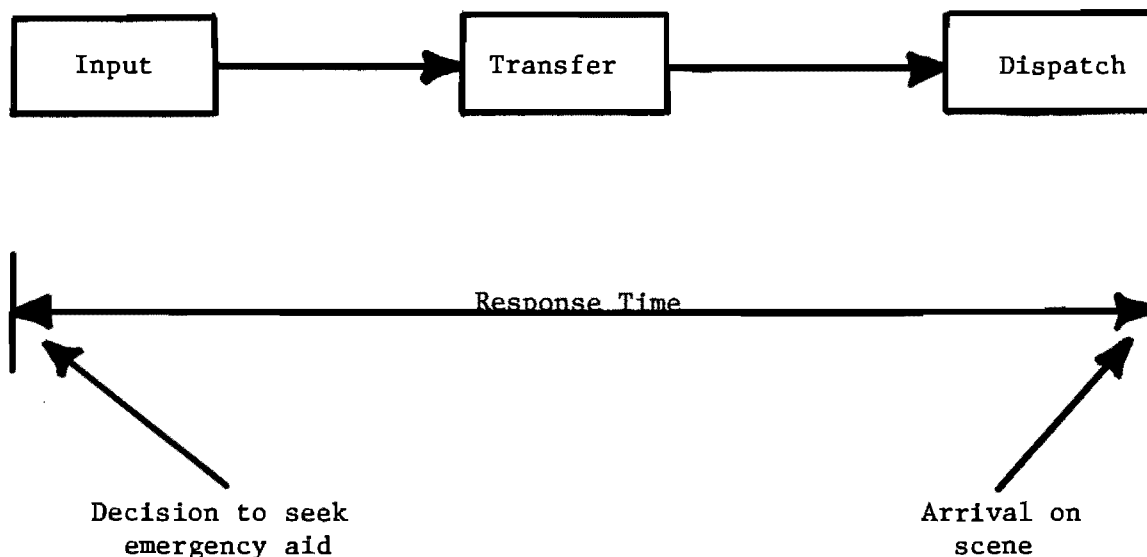


FIGURE 1. COMPONENTS OF RESPONSE TIME

Reduction of Input Time¹⁰. The following advantages of a 911 system reduce input time by eliminating the uncertainty that often exists concerning the proper telephone number to call in an emergency situation:

- (1) Only one number to remember: In many instances the first reaction an individual has during an emergency is to contact an emergency agency directly through the use of a seven digit phone number. It is unlikely that the caller has memorized the appropriate telephone number. Even if he has, the increased pressure during the emergency makes it more difficult to locate or recall the number. Presumably the number "911" would be easy to remember and as the publicity and use of 911 systems increases, this ease of recall should increase.¹¹

¹⁰The reduction in input time as a result of having only three digits to dial instead of seven is not substantial enough to warrant separate discussion.

¹¹The digits 911 were selected primarily due to the lower cost of converting central office equipment.

TABLE 1. EXAMPLES OF POSSIBLE RESPONSE TIME COMPONENTS

I. Input

A. Uncertainty as to what agency to call

1. What response area or jurisdiction am I in? (e.g., Travis County or City of Austin)
2. What specific agency do I call?
3. Does the time of day or day of week matter?
4. Should I call the operator?

B. Locating the telephone number of the desired agency.

C. Inadequate or no response from seven digit number? Dial the Operator?

II. Transfer

A. Determine appropriate emergency service to respond.

B. Connect caller with emergency service.

1. Directly,
2. Give caller the number and have him call, or
3. Take down required information from caller, determine appropriate agency to contact, call agency, and relay information

III. Dispatch

A. Determine aid to be dispatched.

B. Marshal appropriate emergency services.

C. Travel to emergency site.

Note: The intention of this table is to illustrate the typical delays involved in each component of response time. It is not meant to be all inclusive.

- (2) Eliminates the need for the caller to locate the proper number: Callers would be able to contact emergency agencies on a 24-hour basis by dialing 911. Those citizens who do not have the ability to locate numbers in the phone book (e.g., illiterate, mentally retarded, non-English speaking) can be easily taught to use 911.
- (3) Reduces the problem of updating emergency telephone numbers: When emergency telephone numbers change, care must be taken to inform the concerned citizens, telephone operators, and phone book preparers.¹² With a 911 system, the citizens would not have to worry about number changes. As long as the 911 answering center operator has a current listing of agency phone numbers, help can be obtained by dialing 911.

Reduction of Transfer Time. If an individual does not know and cannot locate the seven digit phone number of the desired emergency agency, he will probably contact the telephone operator, who will then dial the appropriate seven digit number. Depending on the configuration of the 911 system in question, several possible improvements over the telephone company operator system in terms of transfer time are likely. For example, if the local police department is selected as the site for the 911 answering center, the telephone company operator relay function will be eliminated for calls for police assistance.¹³ Further, the 911 center may have a "hot line" to other agencies which is faster than having the telephone operator dial the agency. The existence of specially trained 911 operators at the 911 answering center can contribute to the reduction of transfer time in the following ways:

- (1) The specially trained operators should be better able to reassure callers, obtain accurate information, and aid in the dispatch of appropriate emergency services.
- (2) The 911 operator should have a better understanding of the emergency services available in the area than the telephone operator and presumably would not take as long to contact the required agency.

¹² Rural emergency telephone numbers change frequently. For example, seven numbers on the operator checklist (see Appendix) differ from those given in the new phone book.

¹³ In many instances the 911 operator will have to contact other emergency agencies through standard seven digit telephone numbers, which may indeed take longer than a direct call from the citizen to the agency. But this is assuming the citizen knows the correct phone number, which is in general not the case.

- (3) Once the 911 center is contacted it assumes complete responsibility for ensuring that emergency aid is dispatched. This is more efficient than a situation in which the telephone operator transfers a call to what she considers to be the appropriate agency only to have the agency reply that it is not their concern, thus starting the agency search and information transfer process all over again.

Miscellaneous Advantages. The following are some intangible benefits:

- (1) Promotes citizen involvement: By involving the citizens in the planning and publicity stages of implementation, public appreciation for and involvement with community emergency services should increase. In fact, the increased ease of reporting emergencies by 911, together with the community's interest in providing the public with such a service, appears to have created greater awareness and acceptance of public agencies and a heightened sense of citizen responsibility.¹⁴
- (2) Promotes a sense of well-being: The sense of well-being enjoyed by the community is increased when a 911 service is efficiently operated. In addition, the community can take pride in the fact that it has provided such service to visitors and travelers.
- (3) Advantageous to public safety and other emergency agencies: The precise advantages of a 911 system for public safety and other emergency agencies depend in large measure on the sophistication of the system as well as the present emergency service capabilities. These potential advantages could include maximum efficiency in dispatching equipment and forces due to the coordination made possible by centralized reporting, immediate identification of emergency calls, potential for improved emergency data collection for analysis and system improvement, and increased public confidence in the ability of the community emergency services to respond to local needs.

Arguments Against Implementing a 911 System

Benefits Do Not Justify the Costs. Many people feel that the potential benefits of a 911 system do not justify the costs, especially in those communities in which one or more agencies choose not to join the system. In most instances the costs to the community are not as high as many planners would expect (See Chapter IV), but no matter how low the costs they may be too high for the resulting benefits.

¹⁴The Franklin Institute Research Laboratories, op. cit., p. iii.

Local Conflicts Difficult to Resolve. Many times strong debates arise over who is to man the reporting center, who is to dispatch the emergency forces, who is to pay how much, etc. These conflicts may do more harm to the community than the benefits of a 911 system would justify.

Delay in Handling Calls. Some critics argue that compared to the direct access available through a direct seven digit phone call, the routing of a call to a central reporting center (via a 911 system) may increase rather than decrease response time. Where the 911 operator only relays information to the emergency agency, this is undeniably the case-- assuming the caller knows the seven digit number and discounting any appreciable time differential between dialing three digits and dialing seven. In order to evaluate whether this disadvantage is valid in a given case, the specific arrangements of the proposed system would have to be analyzed. A design imposed delay of this type can be altered by restructuring the system¹⁵ (e.g., providing "hot lines" to emergency agencies with "pass through" capability or having the caller directly connected to the emergency agency.)

Crank Calls. Many public officials think that the implementation of a 911 system will lead to an increase in the number of crank calls. Evidence on the likelihood of increased crank calls is difficult to establish. Based on studies conducted in Lincoln, Nebraska, Baton Rouge, Louisiana, and Macon, Georgia, the Franklin Institute Research Laboratories said:

It appears, then, that although a community should be prepared for an initial increase in false calls, there is no reason to suspect that the volume of such calls will be any greater with 911 than with the previous system.¹⁶

Public Support is Lacking, Proponents are Politically Motivated. There is a feeling among some critics that in many cases the pressure for a 911 system is not coming from the emergency service agencies or the public.

¹⁵But the benefits may not justify the cost.

¹⁶The Franklin Institute Research Laboratories, op. cit., p. 72.

Rather it is a political decision with the public acquiescing largely because it sounds like a good system and they are not aware of the problems and costs involved. Many critics think that until the public is more informed on the intent and costs of a 911 system, wholesale implementation of 911 should be avoided.¹⁷ However, it appears that this is more a condemnation of how the system is advocated and implemented than a disadvantage of the system. A valid point is raised, however, in that all concerned parties, especially the public, should make a concerted effort to uncover and understand the costs and benefits of a 911 system before strongly advocating one.

"911" Will be Used to Report Non-Emergency Calls. There is no doubt, based on the history of the cities that have implemented a 911 system, that citizens will use 911 for non-emergency situations. With proper screening procedures by the 911 operator and an active publicity campaign against non-emergency use of 911, the operational impact of this practice should be reduced.

Summary of Pro and Anti 911 Arguments

The primary advantage of a 911 system appears to be the reduction in input time as a result of the decrease in citizen confusion over the appropriate telephone number to use in an emergency situation. Savings could also be realized in the transfer stage due to the special training of 911 operators, probable direct access to at least one emergency service combined with a more efficient relay capability than is currently enjoyed by telephone operators, and the efficiency that results from having operators whose primary responsibility is answering emergency calls. In the final analysis the strongest anti-911 arguments can be summarized as follows: there is no certainty that response time will be any less with a 911 system and even if a system could be designed that would provide quicker access to emergency services, the costs--both monetary and non-monetary--may not be justified by the benefits.

In particular, many critics of a 911 system state that if all a 911 operator does is relay information or transfer calls, he is doing no better than the standard telephone operator. To test this theory, the

New York City Fire Department conducted a study in 1970 in which hundreds of 911 and dial-the-operator calls were made requesting fire assistance. Elapsed time, measured as the time between the completion of dialing and the answering of the phone by the fire department, was recorded for each call. The results were that 911 calls were handled, on the average, approximately 8 seconds faster than dial-the-operator calls.¹⁸ This is not meant to imply that the 911 system will always be more efficient in relaying calls, but it should indicate that the system can be designed to minimize transfer delays. Further, since well over 70 percent of emergency calls are for police assistance, having the 911 reporting center at the police station could substantially minimize the total transfer problem.

In this writer's opinion a carefully designed 911 system can reduce total response time by anywhere from five seconds to a minute or two in extreme cases where citizen panic or difficulty a telephone operator may encounter in locating the appropriate agency plays a major role. The total improvement a 911 system can make to the total of input plus transfer time depends on the current method of contact and provision of emergency services, number of agencies involved, and the design of the proposed 911 system. If projected improvement in total response time is estimated to be a matter of seconds while dispatch time is often a matter of fifteen minutes or more, either a closer look at the real value of the 911 proposal may be in order, or more effort should be spent on reducing the dispatch segment of total response time. Finally, even if meaningful reductions in response time can be expected through the use of a 911 system, the costs of that system must be analyzed in light of the benefits and other possible uses of the funds.

¹⁸The Franklin Institute Research Laboratories, op. cit., p. 20.

CHAPTER III

SURVEY OF THE CAPCO REGION

In order to intelligently evaluate the contribution a 911 system could make to the improved provision of emergency services in the CAPCO region, it is important to have an appreciation for the environment in which the system would operate. This chapter examines the topography and highway systems and analyzes the demographic character of CAPCO, including county totals, populations of the two largest cities in each county, population per square mile, percentage of population in rural/urban communities, and projected growth.¹ Then the agencies that currently provide police, fire, and ambulance services for the region are discussed. Since the telephone companies play a major role in plans for a 911 system, the telephone companies in each county and their respective exchanges are reviewed.

Topography

The following is from a study on emergency medical services for the CAPCO counties:

The surface region is varied and lends itself to evaluation... in several different topographical settings. The area is approximately rectangular in shape with dimensions of approximately 95 miles wide by 195 miles long, with the area oriented in a south-east to northwest direction. It is almost evenly divided through the center by a geographic fault zone.

The topography of the eastward region, proceeding from the center line southeastward, consists of a plain region followed by rolling hills. The western region is a rugged region characterized by steep hills, ravines and rough surface terrain. The entire ten-county area is laterally bisected by a major river, the Colorado River, which flows from the northwest to the southeast and there are several relatively large artificially created lakes along the length of the rivercourse.²

¹ See Appendix for map of CAPCO region.

² L.D. Associates, op. cit., p. 10.

Highway System

The CAPCO region possesses a well-maintained system of hard surface roads that provide ready access to most locations. The major exception is in the western area which has relatively few hard surface roads. The river bisecting the region (Colorado River) presents a barrier to north-south traverse, which can be made only at long interval points. There is a distance of fifty miles separating such traverse in one case.³

Population

It is almost impossible to overestimate either the degree to which Austin dominates the region in terms of population or the rural nature of the non-Austin portions of CAPCO. The following observations are based on Table 2 which provides population figures for the CAPCO counties.

- (1) In 1970, Austin consisted of 56% of the region's total population. That figure is projected to rise to about 61% by 1990. The corresponding figures for Travis County are 66% and 72%.
- (2) In 1970 there were only five cities in the entire CAPCO region with populations exceeding 5,000--Austin, San Marcos, Taylor, Lockhart, and Georgetown.
- (3) The city of San Marcos (18,860) has more residents than six of the ten counties of the region.
- (4) For the most part the region is expected to experience slow growth.

Table 3 points out the predominantly rural nature of the CAPCO counties (Data is from the 1970 census).

Law Enforcement

The law enforcement agencies in the CAPCO region can be classified as either county agencies, which include sheriffs and constables, and municipal agencies, i.e., local police forces. Most citizens are aware of the duties of the local police forces, but some are not familiar with the offices of sheriff or constable.

³Ibid, p. 11

TABLE 2. POPULATION TRENDS--CAPCO REGION

	Actual <u>1970</u>	Projected	
		<u>1980</u>	<u>1990</u>
<u>Bastrop County</u>	17,297	18,400	19,000
Bastrop	3,112	3,226	3,609
Elgin	3,832	4,070	4,545
<u>Blanco County</u>	3,567	3,900	4,300
Blanco	1,022	1,228	1,370
Johnson City	767	926	1,101
<u>Burnet County</u>	11,420	12,700	14,100
Burnet	2,864	2,967	3,158
Marble Falls	2,209	2,620	3,046
<u>Caldwell County</u>	21,178	23,700	26,700
Lockhart	6,489	7,810	9,493
Luling	4,719	5,617	6,974
<u>Fayette County</u>	17,650	16,400	16,300
La Grange	3,092	3,116	3,386
Schulenburg	2,294	2,460	2,834
<u>Hays County</u>	27,642	34,800	44,100
San Marcos	18,860	23,316	31,437
Kyle	1,629	3,012	3,378
<u>Lee County</u>	8,048	6,800	6,500
Giddings	2,783	2,708	2,839
Lexington	719	610	569
<u>Llano County</u>	6,979	7,800	8,800
Llano	2,608	2,603	2,868
<u>Travis County</u>	295,516	383,300	498,800
Austin	251,808	326,879	429,915
Westlake Hills	1,488	2,575	3,580
<u>Williamson County</u>	37,305	46,800	54,300
Taylor	9,616	10,534	11,582
Georgetown	6,395	9,706	12,044
<u>REGION</u>	446,602	554,600	694,600

Source: Capital Area Planning Council

TABLE 3. COUNTY POPULATION--RURAL, URBAN,
& POPULATION PER SQ. MILE⁵

<u>County</u>	<u>Rural %</u>	<u>Urban %</u>	<u>Pop. Per Sq. Mile</u>
Bastrop	42	58	19.5
Blanco	100	0	5.0
Burnet	75	25	11.4
Caldwell	48	52	38.9
Fayette	83	17	18.9
Hays	31	69	41.3
Lee	65	35	12.5
Llano	63	37	7.4
Travis	10	90	291.1
Williamson	49	51	33.1

Note: If the community is over 2,500, the residents are considered to be from an urban area.

Source: Capital Area Planning Council, Criminal Justice Plan, 1972-1976, (1971), p. 19-53.

Sheriff. The sheriff is a consitutional law enforcement officer in the State of Texas. He has broad police authority and is the primary law enforcement officer in the county. Although elected to his office within each county, the sheriff's office is an agency of state government and is commissioned by the Governor. Every official act by the sheriff's office is done in the name of the State of Texas. The sheriff is not directly responsible to any other official within a county, leaving the administration of the office to his discretion to operate within the framework of the law.⁴

Constable. The constable, an elected precinct official provided for in the Texas Constitution, serves as an officer of the precinct justice of the peace court. He is elected to a four-year term and is paid on either a salary or fee basis depending on the county. The constable is supervised, to a degree, by the justice of the peace he serves; but he works directly with the commissioners' court on matters of personnel and budget. He is primarily concerned with the civil process rather than criminal. However, he is granted broad police powers in some locations and serves as an active law enforcement officer.⁵

Table 4 provides a breakdown of the law enforcement manpower (full and part-time employees) operating in the CAPCO region, as of 1971. The most noteworthy fact shown in Table 4 is the low number of law enforcement agents in some of the counties. Table 5 provides the total number of full-time law enforcement agents in each county, population per agent, and area of responsibility in square miles per agent. (The last figure is misleading since, for example, city police authority does not extend throughout the county, but the figure does suggest the generally wide area of responsibility of rural law enforcement agents.)

Ambulance Services

A technical proposal for CAPCO reports that:

⁴Capital Area Planning Council, Criminal Justice Plan, 1972-1976, (1971), p. 2.

⁵Ibid., p. 3

TABLE 4. CAPCO LAW ENFORCEMENT AGENCIES

County	<u>Sheriff's Dept.</u>		<u>Constables</u>		<u>Police Dept.</u>	
	Full	Part	Full	Part	Full	Part
Bastrop	5	2	2	0	11	0
Blanco	1	1	0	0	0	0
Burnet	5	0	0	0	4	0
Caldwell	4	0	1	0	12	3
Fayette	7	0	2	0	4	0
Hays	9	0	2	0	26	2
Lee	3	0	1	0	5	0
Llano	8	0	1	0	1	0
Travis	87	0	7	0	420	3
Williamson	5	1	8	0	25	1

Note: Figures are deflated by nonavailability of figures on other state agencies such as Texas Rangers and Department of Public Safety Officers.

Source: Capital Area Planning Council, Criminal Justice Plan, 1972-1976, (1971), p. 55.

TABLE 5. POPULATION AND AREA PER LAW ENFORCEMENT AGENT⁶

<u>County</u>	<u>Full-Time Agents</u>	<u>Citizens Per Agent</u>	<u>Area Per Agent</u>
Bastrop	18	957	49 sq. mi.
Blanco	1	3,567	719 " "
Burnet	9	1,268	111 " "
Caldwell	17	1,246	32 " "
Fayette	13	1,357	72 " "
Hays	37	747	18 " "
Lee	9	894	72 " "
Llano	10	698	94 " "
Travis	514	536	2 " "
Williamson	38	982	30 " "

⁶Compiled from data provided by the Capital Area Planning Council

Most of the ambulance services in the ten-county area are operated as an extension of funeral home businesses. Many of the owners of the funeral homes indicated they did not consider their ambulance service as a profitable part of their business, but rather a necessary service they felt obligated to offer.⁷

A major problem with the present arrangement is that in many areas the funeral home directors are dissatisfied with the situation and are threatening to quit providing the ambulance service.⁸ Table 6 provides a summary of the ambulance services in the CAPCO region as of March 1972. It suggests the following about ambulance service in the CAPCO region:

- (1) In some instances the emergency vehicle may be in use for a funeral and will not be immediately available for emergency dispatch.
- (2) For most of the ambulance providers in the region, ambulance service is probably an ancillary service and thus is not geared to respond as quickly as a professional ambulance service would, especially during the night.
- (3) The vehicles are not designed nor equipped exclusively for emergency medical service.

Fire Departments⁹

For the most part, fire protection in the CAPCO region is provided by local all-volunteer departments that are financed in a variety of ways, such as contributions and water district voluntary assessments. The only full-time paid fire departments in the CAPCO region are in San Marcos and Austin. The general method of contacting the fire department is through a direct seven digit phone call or a call to the operator, who relays the call to the fire department. In many instances, the Sheriff

⁷James A. Fitzsimmons, "Emergency Vehicle Deployment Study," Appendix VII of Emergency Medical Services System, a technical proposal for CAPCO by L.D. Associates, p. 4.

⁸Conversation of 25 January 1974 with Keith Markley of CAPCO.

⁹As of this writing, comprehensive information on the CAPCO area fire departments is not available. Tommy Lee, candidate for an MBA at the University of Texas, is conducting a study of fire services for CAPCO and provided most of the information for this section.

Table 6. CAPCO Ambulance Services¹⁰

<u>County</u>	<u>Location</u>	<u>Provider</u>	<u># of Vehicles</u>	<u>Type of Vehicle</u>
Bastrop	Smithville	FH	1	SW
	Elgin	FH	1	MP
	Bastrop	FH	1	SW
Blanco	Blanco	FH	1	SW
	Johnson City	FH	1	SW
Burnet	Burnet	FH	3	SW
	Burnet	FH	2	SW
Caldwell	Luling	FH	2	SW
	Luling	FH	4	SW
	Lockhart	FH	1	SW
	Lockhart	FH	2	SW
Fayette	La Grange	FH	4	MP
	Schulenberg	FH	1	Carry-all
	Flatonia	FH	1	SW
Hays	San Marcos	Hospital	3	Vans
Lee	Giddings	Amb. Serv.	1	SW
	Giddings	FH	1	MP
Llano	Llano	FH	1	MP
Travis	Austin	Amb. Serv.	8	MSW
Williamson	Bartlett	FH	1	SW
	Florence	FH	1	SW
	Round Rock	City Serv.	1	MP
	Georgetown	FH	2	SW
	Taylor	City Serv.	2	SW

KEY: FH-Funeral Home SW-Station Wagon MP-Modified Passenger
MSW-Modified Station Wagon

¹⁰ James A. Fitzsimmons, op. cit., p. 24-29.

is the initial contact and he must try to contact the local volunteer fire departments. For example, in Travis County the telephone directory lists two numbers: 476-4333 for fires in Austin and 472-9241 for Travis County fires. The latter number rings at the Sheriff's Office in the County Courthouse in Austin. The person answering the phone determines the closest volunteer fire department and calls them for assistance.

Telephone Company Exchanges in the CAPCO Region

Individuals concerned with the implementation of a 911 system in the CAPCO region must know the specific telephone companies to contact and must consider intercompany variances, including the following: willingness to implement the system, financial resources, present equipment configuration, planned equipment modifications, and knowledge of 911. In general, the more telephone companies and telephone exchanges in a given geographical area, the more difficult the task of implementing a 911 system for that region. Table 7 is a listing of telephone companies and their jurisdictions and indicates the extent of the information gathering, coordinating, and selling effort required to implement a 911 system.

Summary

Throughout this chapter a very definite rural/urban dichotomy consistently emerges. Table 8 summarizes the differences between largely urban Travis County and the remaining predominantly rural CAPCO counties. It is important that these differences be appreciated by regional planners before they attempt to evaluate or develop 911 systems for the CAPCO region.

TABLE 7. CAPCO TELEPHONE EXCHANGES¹¹

County	Telephone Company	Exchanges
Bastrop	Southwestern Bell Continental Telephone Guadalupe Valley General of S.W.	Austin, Bastrop, Elgin, Smithville McDade, Paige Rocky Creek Northrup
Blanco	Southwestern Bell General of S.W.	Austin Blanco, Johnson City, Round Mountain
Burnet	Southwestern Bell Continental Telephone General of S.W.	Austin, Lampasas, Liberty Hill Bertram, Briggs, Buchanan Dam, Burnet, Lake Victor Marble Falls
Caldwell	Southwestern Bell Continental Telephone General of S.W.	Austin, Lockhart, Luling, New Braunfels Fentress, Lytton Springs, Martindale Dale
Fayette	Southwestern Bell Colorado Valley General of S.W. Industry Tel. Co.	Flatonia, Moulton, Smithville High Hill, Hostyn, Plum Fayetteville, La Brange, Schulenberg Carmine
Hays	Southwestern Bell General of S.W. San Marcos Telephone	Austin, Lockhart, New Braunfels Buda, Dripping Springs, Kyle, Wimberly San Marcos
Lee	Southwestern Bell General of S.W.	Elgin, Rockdale Dime Box, Northrup, Giddings, Lexington
Llano	General of S.W.	Tow, West Llano, Kingsland, Llano
Travis	Southwestern Bell	Austin
Williamson	Southwestern Bell Continental Telephone General of S.W. Mid-State Telephone	Austin, Bartlett, Liberty Hill, Taylor Coupland Georgetown, Granger, Jarrell, Thrall Florence, Hutto

¹¹Information provided by Southwestern Bell and letters from some of the telephone companies in the region.

TABLE 8. TRAVIS COUNTY AND RURAL CAPCO COUNTIES COMPARED

Characteristic	Travis County	Rural CAPCO
Population	Urban	Rural
Growth	Rapid	Slow
Fire Departments	Full-Time paid	Volunteer
Ambulance Service	Full-time paid	Funeral home--Sideline
Law Enforcement	Many Agents	Few Agents
Phone Companies	One company, one exchange, large captial base	Many companies and exchanges. Some with limited captial base.

CHAPTER IV

PRELIMINARY CONSIDERATIONS OF 911

Before suggesting a general outline for a proposed 911 emergency telephone system for the CAPCO region, it is necessary to consider the possible benefits and costs of the system, suggest possible evaluative criteria, highlight some of the major obstacles to development, and indicate possible sources of funding for the system.

Potential Benefits of 911 for the CAPCO Region

Three facts should be kept in mind when the potential benefits of 911 for the CAPCO region are being evaluated. First, it cannot be assumed that the benefits of a 911 system in a predominantly urban environment exist in a rural environment. Second, it is possible that the benefits of a 911-type system can be provided at a lower cost in a system that does not incorporate 911 as the entry mode. Third, many of the potential benefits are viewed differently by the urban citizen, the rural citizen, and the traveler.

Urban vs. Rural Environment. The primary arguments for a 911 system can be summarized in one statement: The time taken to summon emergency aid can be reduced, thus helping to insure the prompt arrival of the emergency services at the emergency site. It is difficult to derive a meaningful figure for average time saved by having 911. Studies generally only measure and compare the time it takes a caller to reach the emergency agency using either 911 or the operator. Perhaps more important would be measuring the time it actually takes for emergency aid to reach the site once the decision to seek aid is made. How could we measure and perhaps incorporate the time delay caused by citizen uncertainty as to whom to call and/or the delay in looking up appropriate seven-digit numbers? Although no studies of this nature were found during this research, it appears that the time saved by a 911 system is in terms of seconds, or perhaps

a minute, depending upon the circumstances. When the response time of emergency services is measured in minutes (e.g., five or fewer minutes), a saving of perhaps a minute is indeed substantial. But when response time is perhaps 20 minutes to an hour for certain services, a saving of a minute does not appear critically important. Thus, the rural/urban dichotomy of the CAPCO region with the attendant service delays may well effect the proposed design of a 911 system for the region. Another characteristic of a rural environment is that there is far less confusion as to the "proper" phone number to call in case of an emergency. The problem is more often one of a scarcity of emergency services. Thus, benefits of a 911 system that accent the decrease in uncertainty and confusion as to what number to call may be somewhat overstated in rural areas. (Rather than being confused, visitors would seem likely to quickly realize their total ignorance and contact the operator.)

Critical Evaluation of Present System. No matter what the literature on 911 may say, the benefits of a proposed 911 system should be determined based on considerations which truly reflect the local situation. In some areas a widely known seven digit number may be serving the same purpose as a 911 system. Thus it is probably not uncommon for the local sheriff or fire house to be the recipient of what would be termed 911 calls. Where these rather informal systems may be doing an adequate job, the incremental costs of a 911 system would probably far exceed the incremental benefits. To treat each town in the CAPCO region as if it were part of a homogeneous environment that can derive essentially equal benefit from a 911 system may be an assumption that will lead to waste of scarce resources, hinder local initiative, and create ill will.

Rural vs. Urban vs. Traveler. Closely related to the urban/rural split mentioned above is the need to view the potential beneficiaries of a 911 system as urban residents, rural residents, and travelers. Ideally, a traveler would like to have an emergency number to call no matter where he goes. Although possibly a desirable goal, perhaps the benefit to travelers should not be accented, considering that the primary source of funding for any proposed 911 system will be the CAPCO residents. However, a sound planning approach to a 911 system for the CAPCO region should

consider the specific input mechanisms and emergency service needs of the three classes of users and should consider many alternatives before recommending the area-wide establishment of 911.

Criteria for Evaluation of the System

The criteria selected for evaluation of a proposed system are subject to debate, but it is hoped that they will adequately serve as initial benchmarks as well as provide others an opportunity to debate the selection and perhaps suggest modifications to that list.

Improvement Over Present System. The emergency response system should be viewed in the context introduced in Chapter II, i.e., input, transfer, and coordination (See Figure 1, page 13). The measure of improvement is the total contribution the proposed emergency telephone communication system can make in reducing response time. Response time is defined as the time that elapses from the moment a citizen desires to seek emergency aid via the telephone to the arrival of that aid at the site of the emergency.

Needs of the Community. There should be a match between the needs of the community and the services provided by the proposed system. Relevant to this consideration are such items as the ability of the current emergency system to benefit from improved input times, future needs of the community, and alternative uses of funds.

Costs¹. All other factors being relatively equal, the system with the lower cost per citizen served is preferred. The costs considered are those for which the citizens, through their governmental agencies, will be responsible.

Adaptability. The degree to which a system can be economically changed to accommodate desired service modifications is the fourth evaluative criterion. A significant element of this criterion should be the

¹Only relative costs based on educated guesses will be provided. To obtain specific costs would be a monumental task that would require detailed knowledge of existing facilities, trunk requests, and proposed central office configurations.

evolutionary capability of the system. Specifically, if a "less than 911" system is selected, how readily can the proposed system be upgraded to a full 911 system should the need arise, funds become available, or legislative action makes 911 systems mandatory? How the system can be modified to become an integral component of a geographically larger emergency communication network should also be considered.

Difficulties Encountered With 911

Many public officials and most citizens do not appreciate the very real difficulties inherent in a 911 system. To many it seems just a simple matter of asking the phone companies to free the 911 digits and route the calls to the appropriate answering center. Phone company reluctance is often viewed as basic administrative inertia or a desire not to make investments in capital equipment. In addition, such problem areas as non-congruence of political/emergency service/phone company boundaries and the need for interservice cooperation are often not given the very serious attention they deserve. The following two sections indicate the potential problems 911 poses for the telephone companies as well as the noncongruence of service boundaries.

Telephone Company Operations--Problems for 911. The intent of the following discussion is not to indicate that the entire CAPCO region would be faced with the same difficulties as the Austin metropolitan telephone exchange. Rather, the intent is to use the Austin exchange as an example of the difficulties that may face other telephone exchanges. (The fact that the Austin Southwestern Bell exchange services over two-thirds of the population in the CAPCO region is perhaps sufficient reason to use it as a focus for discussion.) To better appreciate what follows, the reader should refer frequently to Figure 2.²

The following definitions of terms used by telephone companies are interpretations of the terms as used in discussions with Southwestern Bell

²The author is deeply indebted to Mr. John Thompson, Marketing Representative for Southwestern Bell, for the enthusiastic and patient explanations and aid he provided.

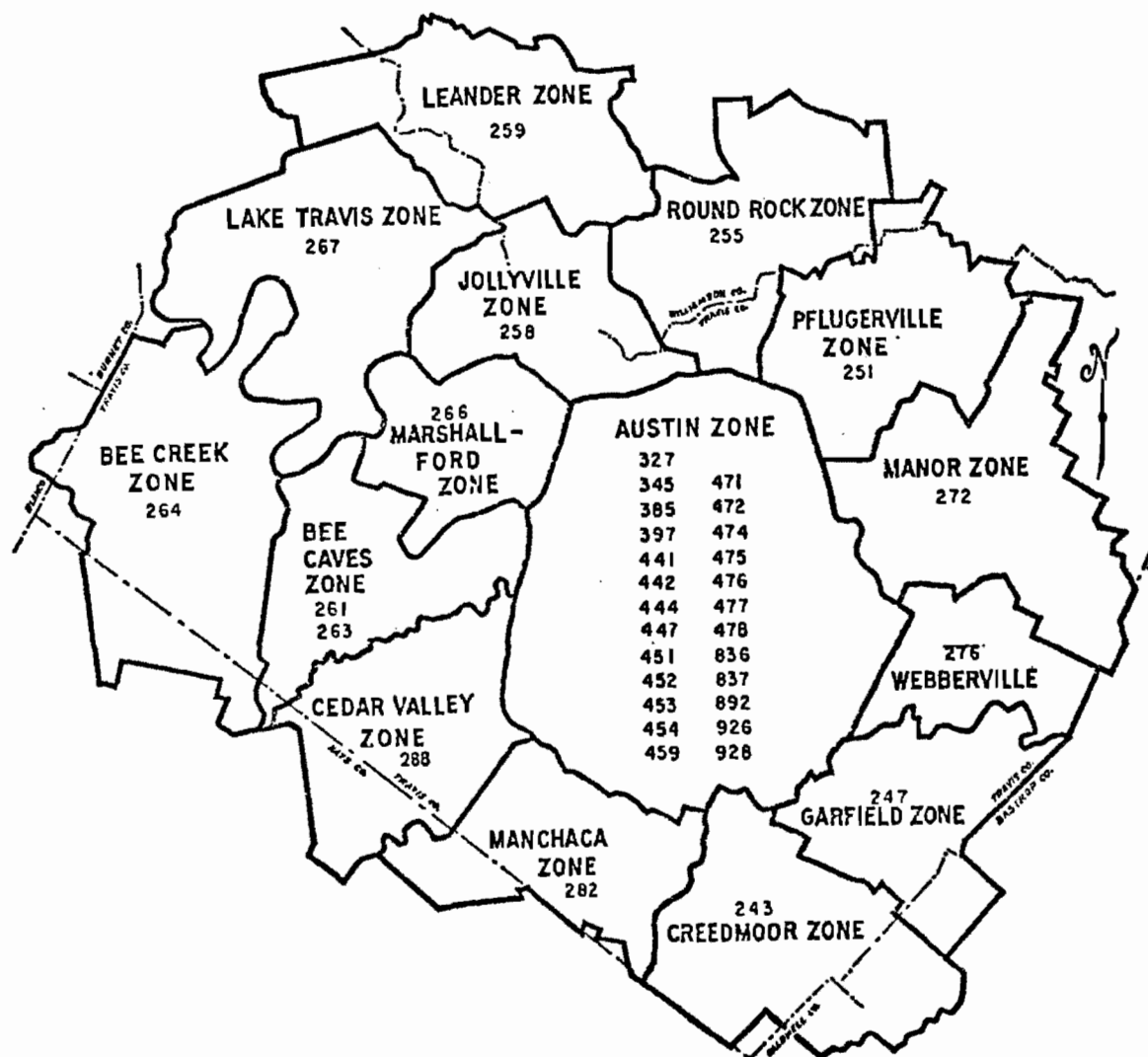


FIGURE 2. AUSTIN METROPOLITAN EXCHANGE SHOWING ZONE AREAS AND NNX'S

officials. The definitions help to shed light on how present rate structures and equipment configurations have evolved.

- (1) Exchange Area: An exchange area is a major service area of a telephone company. It contains many service zones and is generally associated with a major population center, such as the San Antonio Exchange or the Austin Exchange.
- (2) Zone: A zone is a division of an exchange area designating a geographical concentration of telephone subscribers. A zone contains at least one central office.
- (3) Central Office: A central office is a telephone building housing the major trunking and switching facilities that serve a given geographical area. There can be more than one central office in a zone.
- (4) NNX: NNX is the term used to describe the first three digits of a standard seven digit phone number. The first two digits of the NNX identify the central office serving the subscribers with those first two digits in their telephone number. There may be more than one NNX in a zone.
- (5) Community of Interest: Community of interest is a term used by the phone companies to describe those zones within the exchange area with which a subscriber is most likely to communicate via the telephone. In general, zones defined as being in the community of interest will be the zone from which the call is originating, contiguous zones within the metropolitan exchange area, and the metropolitan zone (in this case the city of Austin.) For example, the community of interest for the Leander zone would be the Leander zone, Lake Travis zone, Jollyville zone, Round Rock zone, and the Austin zone. The importance of the community of interest concept is that since it would be too costly to monitor all the calls in the community of interest for billing purposes, the subscriber pays only a monthly charge and is entitled to unlimited calls within his community of interest. On the other hand, calls outside the community of interest can be economically monitored and appropriate costs and tolls determined.
- (6) Toll Calls: Telephone calls to areas outside the community of interest incur a special toll and are thus toll calls. To initiate a toll call, the caller must start his call with a "1". Thus, in the absence of dedicated trunking from the originating zone to the toll zone, a call to the 911 center in the toll zone would have to be a "1 + 911" call. Aside from the confusion of a "1 + 911" system would generate, the costs of such a system are substantially higher. This is because as the caller completes the "1 + 91" portion of his call he has gained access to long distance trunks that are ready to route his call to areas of the country that have 91x area codes.
- (7) Concept of Usage Sensitivity: Telephone companies attempt to set rates that reflect the actual costs involved in the use of company

equipment and personnel by a subscriber. Where traffic density is so great that accounting for every call would not be economically justified (such as in the community of interest), a flat rate is charged each month. In some instances the pattern of calls may change over time so that it is better to enlarge the areas of toll free calls and adjust the monthly charge accordingly. (This has been recently done in San Antonio.)

- (8) Ninth Level Sensing Capability: Ninth level sensing capability is the ability of central office telephone equipment to detect or respond to the dialing of 9 in the first position of the phone number. If the central office does not have this capability it is not a simple matter of adjusting a dial or two to achieve this capability. Instead, substantial sums of money may have to be invested.

The following implications of the concepts introduced above become evident when one selects a site for the 911 answering center:

- (a) Will the call be a local call or a toll-free call?³ Fortunately all calls made to Austin from within the Austin metropolitan exchange are toll-free. Thus if Austin were made the answering center for Travis County, all 911 calls from within Travis County would be toll free.
- (b) The Austin zone currently has two NNXes with a 9 first digit-- 926 and 928. Since all the zones in the Austin metropolitan exchanges have direct access to the Austin zone, direct trunking for the "9" already exists from each of the zones to Austin. Thus, additional equipment is not necessary to provide Austin with the ninth level sensing capability nor will the outlying zones need to modify their equipment to accommodate a 9 in the first position. In this particular case only extending existing equipment capabilities to accommodate the expected 911 traffic flow is required.
- (c) Present trunking arrangements, switching procedures, and tolls charged customers are the result of studies by telephone engineering departments. Any deviations from these procedures must be carefully studied to determine the actual costs of a proposed 911 system.

Noncongruence of Boundaries--Problems for 911. This problem is the easiest to understand and will probably be the most difficult to overcome. An adequate appreciation of the problem requires a two-stage discussion.

³"Toll-free" vs. "toll" is to be viewed as indicating the degree to which phone company equipment must be modified or upgraded to accommodate "toll free" calls.

- (1) Political and Emergency Service Boundaries: The problem of the congruence of political and emergency service areas of responsibility is largely one of accountability and responsibility for payment for services rendered. This problem exists whether or not one is trying to plan a 911 system, but somehow it must be addressed and solutions reached before detailed 911 plans are developed. Most assuredly a 911 system introduced in an atmosphere of mutual recognition of benefits to be derived and attendant cooperation will have far better chances for success than one introduced where such cooperation does not exist. Details must be worked out to specifically identify primary and secondary areas of responsibility as well as methods of compensation for services rendered when agencies from one political jurisdiction provide services for a "foreign" government. Machinery must be established to provide for periodic review of the service rates so that citizens will not find themselves without service during periods of debate over compensation.⁴ CAPCO can provide both the forum and the basic machinery for deriving some order from the existing pattern of emergency services. But as an advisory and planning body CAPCO cannot in any way be viewed as a potential supragovernmental agency with powers to tax, conduct majority-rule referendums, or decide who will provide what service and at what price. Such activities must be carried out by duly constituted governmental bodies or by agreements between service providers with or without consultation with governmental bodies. Regardless of how service agreements are derived (government initiated, voluntary service negotiations, etc.) it is important that some agency periodically inventory existing service levels and area coverages to uncover any gap before it is discovered after-the-fact. For example, the fire departments in Nassau County on Long Island, New York, are largely voluntary. Several years ago three volunteer fire departments responded to a "house on fire" call. While the three departments argued over who was to put out the blaze, the house was completely destroyed. More than likely, a better planning and review procedure could have avoided this tragedy.
- (2) Phone Company Boundaries: Even if some degree of cooperation and coordination can be achieved in those instances in which political and emergency service areas of responsibility do not coincide, a problem still exists since in many cases a given political area is served by more than one telephone company. A similar problem exists in those instances in which a telephone company zone serves portions of more than one political jurisdiction. Only one telephone company services Travis County, but as Table 9 shows this is certainly not the case in the other counties in

⁴The author was told of an occasion in San Antonio in which a fire department arrived at a fire site, checked for signs of human life, and let the property burn to the ground in protest over the compensation agreements reached for providing service to nonlocal governments.

the CAPCO region.⁵ The operational and economic consequences implied by Table 9 are as follows:

- (a) Having more than one telephone company results in a large expense to develop the capacity to detect and/or route a 911 call or add additional equipment to handle 911 traffic.
- (b) Zones serving portions of more than one county require the central office to discern from which side of a given political boundary a call is originating.

Thus, arrangements must be made to facilitate the screening of calls, and/or cooperative agreements must be made with service agencies that will provide adequate levels of emergency service to all who live in the exchange area. Furthermore, the existence of many exchanges in the area creates a problem. For a fully operational 911 system, each central office's equipment must know what to do when it receives a 9 in the first position. The degree of difficulty of doing so depends on the present equipment configuration, number of subscribers, economic strength of the phone company, and desired system. With numerous exchanges in an area, the number of companies that must be approached will generally be higher and thus the advantages of economies of scale cannot be capitalized upon, i.e., five companies, each with one exchange, will probably have to spend more money than one company with one exchange to accomplish the same size task.

Costs for 911

For discussion purposes the costs of a 911 system are classified as follows: one-time; continuing; paid by the telephone company; and paid by the subscriber.

One-Time Costs. One-time costs include modification costs for telephone company central office equipment; the costs of installing additional trunks, lines, and associated equipment at the 911 answering center; and costs incurred in securing and initially staffing the answering center. By far the greatest costs would be the costs of modifying telephone company central office equipment. Unfortunately, this cost is the most difficult to specify. Where ninth level sensing and trunking already exist, costs

⁵Although Travis County is fortunate in having only one phone company serving it, problems still exist since the Austin Metropolitan Exchange includes portions of five other counties.

TABLE 9. TELEPHONE COMPANY EXCHANGES SERVING CAPCO

County	No. of Companies	Exchanges
Bastrop	4	8
Blanco	2	4
Burnet	3	9
Caldwell	3	8
Fayette	4	11
Hays	3	8
Lee	2	6
Llano	1	4
Travis	1	1
Williamson	4	11

Source: Southwestern Bell Telephone Company

may be fairly moderate. But in those instances in which it does not exist, costs can be substantial and even prohibitive for a small company. Cost estimates can best be established by contacting the phone companies directly. The following paragraph from a letter received from the Colorado Valley Telephone Co-operative, Inc., in La Grange, Texas, provides an example of the initial costs a 911 system could present to a small telephone company. (2,500 subscribers and 1,300 miles of line).

In our situation, several selectors would have to be installed. In some cases fifth selectors would also be needed. If these special selectors were installed the original selectors could be wired making 911 trunks accessible. The costs would be staggering in six exchanges to a company as small as ours.⁶

Costs associated with securing and initially staffing the emergency reporting center will depend on the availability of a suitable location, capability of present emergency service dispatchers to assume additional duties, scope of required planning and coordination activities, and number of trunks desired. In terms of monetary costs, the planning and coordination activities should be fairly inexpensive for most communities since many formal and informal bodies (city councils, county boards, CAPCO, etc.) already provide an excellent vehicle for planning and coordination. The costs for installing a 911 system (the trunking and equipment associated with the answering center) have historically been quite low, as Table 10 demonstrates. It should not be assumed that any of the costs indicated in Table 10 would adequately reflect the costs of implementing 911 in the CAPCO region. They are presented merely to indicate the cost levels experienced by other communities.⁷

Continuing Costs. Continuing costs include costs to operate the answering center and monthly charges levied by the telephone companies for

⁶Letter of March 26, 1974 from Jack A. Campbell, Manager of Colorado Valley Telephone Co-operative, Inc. Subject: Emergency-911.

⁷It is interesting to note that the monthly charges for Suffolk County, New York initially decreased by \$1,900 per month since 40 telephone numbers were consolidated into one--911.

TABLE 10. TYPICAL 911 INSTALLATION COSTS AND MONTHLY CHARGES

City, State	App. Pop. Served	Services	Installation Costs (\$)	Monthly Charges
Buffalo, N.Y.	463,000	P,F,A	840	272.82
Baton Rouge, La.	186,000	P,F,A	355	364.00
Evanston, Ill.	80,000	P,F,A	225	18.50
Huntington, Ind.	30,000	P.F.A	100	100.00
Jackson, Miss.	250,000	P,F,HP,SO	100	80.00
Lawrence, Kan.	45,000	P,F,A	None	20.00
Trenton, N.J.	104,000	P.F.A	108	36.00

KEY: P = police; F = fire; A = ambulance; SO = Sheriff's Office;
 HP = highway patrol.

Source: The Franklin Institute Research Laboratories, 911, A Handbook for Community Planning, (October, 1972), p. 75.

the services provided. Costs of concern to planning officials are the incremental costs associated with the 911 system. In those instances in which present emergency answering services can sufficiently cope with the full range of 911 services, incremental costs may be minimal. Where substantial augmentation of operator personnel is envisioned and/or continual training is a major problem, costs will be accordingly higher. As Table 10 shows, it is difficult to say much about monthly telephone company charges other than that they depend on the answering center equipment.

Costs Paid by the Telephone Company. The American Telephone and Telegraph Company (Bell System) has indicated it will pay for all costs associated with equipment changes and additions required to free the digits 911 for nation-wide use as a universal emergency telephone number. (Total costs for this will exceed \$50 million.)⁹ Thus on the surface it appears that CAPCO need not worry about the possibility of higher costs for a 911 system where AT&T is responsible. However, at least three considerations may alter this conclusion. First, just because someone else is paying for a service does not mean that provision of that service is justified. Second, the smaller phone companies have not indicated they will absorb the costs of modification even if they could. Third, it is perhaps foolish to think that Bell is actually providing the modifications for nothing. Like most other U.S. corporations, Bell Telephone has a responsibility to their stockholders to earn a profit. It would not be surprising to discover that phone company expenditures for 911 may be eventually recovered through adjustments in the rate structure some time in the future.

Costs Paid by the Subscriber. The subscriber can be viewed as that agency representing the people served by the 911 answering center. Thus the city, county, region, etc. will be called upon to pay certain costs, such as installation and operating costs. In most instances, public grants from HEW can be obtained to help defray these costs for the initial year or two. In instances in which funds are earmarked for specific purposes, such as fire fighting, criminal justice, or health care, it may be possible

⁸General Telephone, op. cit., p. 7.

to show that 911 aids these specific causes and is deserving of public monies to help defray subscriber costs.

Two Commonly Asked Questions About 911

Why not change the telephone company service boundaries to coincide with existing political boundaries? The answer is simply that the costs would be prohibitive. The key to understanding why the costs would be high is the fact that we are talking about actual physical connections from subscriber phones to telephone company central offices. Thus, in order for a subscriber to be changed from one central office to another (the operational consequences of making service boundaries and political boundaries coincide), one company would, in effect, have to abandon the investment it made in originally connecting that subscriber, while the gaining company would have to invest additional funds to pick up that subscriber. Perhaps future service areas will be or could be more closely aligned with political boundaries, but most assuredly telephone companies will not voluntarily realign present service boundaries.

What about the possibility of having 911 as an access to a recording of emergency telephone numbers? This possibility is often raised as a perhaps less costly alternative for those areas in which the 24 hour manning of an emergency answering center would be impractical. Although the local communities would not have to incur costs for establishing and operating a 911 center under this alternative, the cost to the telephone company would be essentially the same since telephone company equipment would still have to intercept and interpret a 911 call. In the final analysis, it would seem difficult to show such a system worth the investment when the telephone operator can presently provide the needed emergency information. Furthermore, expecting the emergency caller to patiently listen to a recorded list of telephone numbers is perhaps asking too much.

CHAPTER V

A 911 SYSTEM PROPOSAL FOR CAPCO

The primary criteria used in developing this proposal were: (1) the potential decrease in response time (the time interval from the time an individual decides to seek aid to the time that aid arrives); (2) the match between the needs of the community or region and the service provided; (3) the costs of the system, both to the phone companies and to the consumer; and (4) adaptability of the system to future modifications. The proposed system is evaluated in light of these criteria.

Can the CAPCO Region Benefit From a 911 System?

As Chapter II indicated, the potential benefits of a 911 system would be best recognized in a predominantly urban environment. Thus, with the clear urban/rural split in the CAPCO region, a proposal for a region-wide 911 system may be difficult to defend. However, provided the costs are not too high, it seems that at least certain areas of the CAPCO region could benefit from a 911 system. Certainly, if the associated costs could be kept at a minimum, the increased peace of mind to the average citizen and traveler would make the expenditure worth-while. From a practical standpoint, the fact that the CAPCO region can benefit from Federal monies for emergency health services if it adopts a 911 system may be a strong factor in advocating a 911 system for CAPCO.

System Recommendation

The system recommended here contains the following four activities: (1) Implement a 911 system in Travis County with the Austin Police Department dispatch room as the central answering center. (2) Start initial 911 feasibility studies and planning activities in each of the other CAPCO counties on a county-wide basis. During this phase, place special emphasis on developing 24-hour access to emergency services and explore the possibility of establishing a widely publicized seven-digit

number and a central answering center. (3) In addition to the county planning efforts, encourage individual communities to implement 911 if local conditions warrant. (4) Areas in which a 911 system may be currently economically or administratively infeasible should continue to monitor the progress of the other communities in CAPCO so they can benefit from ideas that could improve their present method of providing emergency services.

Evaluation of the "Travis-County-First" Approach

In this section, the "Travis-County-first" approach is evaluated in terms of the four criteria stated in the introduction. The reasons why other alternatives were rejected are included as each criterion is discussed.

Potential Decrease in Response Time. Response time is critical for two reasons. First, there must be some assurance that the proposed 911 system will indeed lead to shorter response times. Second, the current system response times must be short enough to benefit from the potential improvement of the 911 system. In Chapter II it was indicated that the primary reduction in total response time directly attributed to the 911 system came from the reduction in citizen uncertainty over the proper number or agency to call. In rural areas there generally is less confusion over the proper agency to call and telephone directories are not as crowded with emergency telephone listings. In some instances, a rather informal 911 system already exists with calls for aid generally made to the local police office. In Travis County there is substantially more confusion generated by the large number of emergency agencies and associated telephone numbers and thus greater potential for confusion reduction exists. Due to the lower population density and lower level of emergency services per unit of area in the rural counties, emergency service response times are generally measured in terms of ten or more minutes. Thus the rural counties cannot benefit as effectively as Travis County from the estimated 15 to 60 second improvement in input time made possible with a 911 system. Some proponents of a 911 system might argue that with a 911 system the ability to contact emergency services from wider geographical areas and to coordinate their activities would improve response times. This may very well

be true, but this particular improvement in response time could be achieved through coordination mechanisms and cooperative agreements without the necessity of having a 911 system. The question arises as to whether having a 911 answering center at each county seat for the entire county would reduce response time. The answer to this question obviously depends on the current means of providing the specific emergency services as well as the current method of contacting these services. In those instances in which emergencies are primarily handled by local resources and the emergency agency can be easily contacted, the installation of a 911 system that would route calls to the county seat would seem hard to justify since all the 911 operator would do is relay the message to the local agency. In counties where the county seat is the main provider of emergency aid, having the answering center located there would probably make more sense. In summary, Travis County citizens would probably benefit the most of all of the CAPCO residents in terms of the reduction in confusion that a 911 system would provide due to the larger number of emergency agencies and the more rapid response times of emergency services in Travis County. A plan that calls for the blanket implementation of a 911 system in the rural CAPCO counties either has not viewed the reduction in response time such a system could provide in the light of the present response times or attributes response time reduction to portions of the 911 system that can easily be developed independent of a 911 system.

Current Needs of the CAPCO Region. The CAPCO region suffers from the problem facing most rural areas--insufficient level of emergency services (i.e., long response times) and insufficient funds to provide the residents with the level of service they desire. To understand the contribution a 911 system could make towards decreasing the emergency service response time in rural communities it is important to distinguish between the answering function and the dispatch function. Many proponents of a 911 system encourage it because it would provide a 24-hour-a-day answering capability. But the problem is obviously not answering capability. (The telephone operator, in most cases, provides a 24-hour-a-day answering capability). The problem is having resources to dispatch and having dispatch authority over these resources. Without first having established

this dispatch capability,¹ it is difficult to see that a 911 system would be an improvement over calling the operator who would contact the agency that could provide the emergency service. There may be a tendency to view these comments as implying that the dispatch/access capability should be developed at the same time that the 911 system is being implemented. On the contrary, it is recommended that the dispatch capability be worked out first and employed over an extended period of time before a 911 system is added. In some cases it may develop that once 24-hour access to emergency services is a reality non-911 methods of gaining entrance to the system may suffice. In other cases the original selection of the answering center location may have to be changed, the specific services that desire to have a common number may change, cooperative agreements may have to be altered, etc. In most rural areas a 911 system is an expensive proposition that is best implemented in an emergency service environment that has stabilized--if only to guard against expensive changes or the abandonment of substantial investments. Travis County, for the most part, has possessed 24-hour response capability for all emergency services for many years. It is in the best position to benefit from a 911 system and in that sense a system proposal calling for the implementation of 911 only in Travis County and perhaps a few selected communities in the CAPCO region is most attuned to the needs of CAPCO.

Costs. Despite the fact that Travis County has about two-thirds of the population in the CAPCO region, the costs to implement a 911 system in Travis County--especially the subscriber costs--would probably be far less than in any of the other counties. The reasons for this are as follows:

- (1) Travis County is served by only one telephone company--Southwestern Bell.
- (2) Southwestern Bell has agreed to pay for the central office modifications that will be needed to implement 911.
- (3) A call from any area in the Austin Metropolitan Exchange, which is all of Travis County, is toll free. Thus the call is not preceded by a "1" and additional equipment modifications are not required.

¹Dispatch capability, in this sense, is the ability to either quickly provide or contact emergency resources.

- (4) The central zone (Austin) already has an exchange beginning with a 9 (926, 928). Because of this, trunking already exists for the 9 from all zones to the central zone and each zone office already knows what to do with a 9 in the first position--route it to Austin.
- (5) The Austin Police Department already has a dispatch room that is manned 24 hours a day and this facility has "hot lines" to both the ambulance service and the fire department.

The specific costs of a 911 system for Travis County could not be determined without providing specific trunk and equipment requests to Southwestern Bell, but given the rather substantial advantages currently enjoyed by Travis County it is difficult to see that the marginal costs would be any higher than those for a similar sized city in the United States (See Table 10 in Chapter IV.) Based on this assumption, it seems that the monthly cost to Travis County for a 911 system would be from \$200 to \$300 a month. In Chapter VI it is estimated that the subscriber costs for the least expensive 911 system for Bastrop County (considered a typical rural county) would cost between \$1,400 and \$3,600 per year.² This is between 8 and 20 cents per citizen per year. Even if it is assumed that the rural counties could benefit from a 911 system to the same extent as Travis County, it is apparent that Travis County represents a more effective use of funds, i.e., lowest cost per citizen provided with a 911 system--one cent versus 8 to 20 cents.

Adaptability. In the sense that a Travis-County-first approach will facilitate the future growth of 911 for the citizens of CAPCO, it meets the adaptability criterion. First, although Travis County has many factors in its favor, it must still address some of the same problems that must be faced by the rural counties, such as noncongruent political and service boundaries; effective means for publicizing any seven digit numbers that planners desire the public to continue using, such as local volunteer department numbers; and efficient handling of calls. It is one thing to read about the problems other states are having or have had, but it is quite another to be able to benefit from the experience of a region in the

²Perhaps in a larger sense the costs to the telephone companies should be considered as well, but in Chapter IV it was decided that only the costs to the governmental agencies would be considered.

CAPCO community. Second, as mentioned in Chapter III, the population of the CAPCO region is expected to increase by 250,000 from 1970 to 1990, with approximately 200,000 of this increase expected in Travis County. By implementing a 911 system in Travis County now, the cost of accommodating the population increase should be less--especially for the telephone companies--than if 911 were installed later.³ Third, a Travis-County-first approach allows the other counties to more fully evaluate their needs, determine their ability to benefit from a 911 system, and isolate and solve problems. This is especially important in this instance since, so far, little 911 planning has been done. In summary, Travis County affords an opportunity to inexpensively provide over 300,000 people (66% of CAPCO) with a 911 system that could reduce emergency response times, aid travelers and visitors, and perhaps increase the community's sense of well-being. To implement a 911 system on a county-wide basis in any of the other CAPCO counties, in general, does not seem justified at this time due to the questionable benefits of the system for rural areas, probable high costs, and unresolved problems in the establishment of a 24-hour-a-day response capability for emergency services.

System Recommendation--Discussion and Implementation

This section focusses on the four recommendations made for the implementation of 911 in the CAPCO region. Much of the discussion centers on Travis County, but it should be realized that every county will face problems of a similar nature.

Implement 911 in Travis County. The exact sequencing of steps may vary due to the personalities, past conflicts, and issues involved, but the first step should be a meeting of CAPCO, county and city officials to discuss the proposed system as it would effect the city and county police, fire, and ambulance services. Points to be stressed at this meeting should include:

³Any proposal that advocated a 911-type system in Travis County would just as effectively provide this advantage.

- (1) Each agency will maintain its own dispatch facility and will still have control over its own resources.
- (2) Because the Police Department will most likely be the reporting center, arrangements will be made to ensure that it is not unfairly saddled with additional workload.
- (3) There are no plans to upgrade the Austin Police Department into an emergency reporting center for all of the CAPCO region.
- (4) Costs to the agencies will be minimal.
- (5) Southwestern Bell Telephone Company will cooperate fully in any way they can to help implement the system.⁴
- (6) Each emergency agency will continue to have its present seven-digit telephone number in addition to the 911 number, although the use of the 911 number will be encouraged as the principle public access to obtaining emergency aid.

The meeting is recommended as the first step because it allows for consideration of potential emergency agency doubts, conflicts, or misunderstandings about the system which might go unattended only to surface later during meetings with phone company officials or the public. A key problem to be overcome will probably be to convince the Austin Fire Department that it should join the 911 system. In discussions with the fire department the time savings resulting from less number "look up" time and/or confusion as to the action to take should be stressed. Second, with a hot-line with pass-through capability⁵ going from the police department to the fire department, the fire department dispatcher can be talking to the caller within a few seconds after the call is answered by the police department. Thus, the problem would seem to be to ensure that the 911 operators will be able to answer the call promptly. Studies of emergency call patterns can help indicate adequate manning levels. The resulting arrangement would be as fast as a direct call (assuming the number is known) and would be faster

⁴This writer cannot stress enough the cooperative attitude of Southwestern Bell. Company officials realize they have a moral responsibility to their customers to provide telephone access to emergency services. If Travis County desires that access to be a 911 system, Southwestern Bell is eager to comply.

⁵The New York City 911 system is designed so that when the 911 operator (a city policeman) transfers the call to the fire department, all three parties are on the line. Perhaps Travis County would desire the same service.

than a call to the operator (hot-line versus operator dialing the seven-digit number after he has located the proper number). Rural residents would be advised to continue to use direct contact with their volunteer fire departments, but the 911 system would still provide aid to those citizens who fail to recall the correct seven-digit number. (This is apparently quicker than the present system in which if a citizen is reporting a "Travis County fire" and does not know the proper number, he would call the operator who would then contact the Sheriff's office, who would then contact the nearest fire department.) Once all the concerned agencies understand the intent of the 911 system and realize that planning officials are aware of possible problems to be overcome, a meeting should be arranged with Southwestern Bell marketing and engineering officials to discuss the proposed system. They would be expected to fully explain and/or verify aspects of the 911 system that were introduced in this report and provide insight into the specific equipment requirements and estimated monthly charges. (Accurate monthly charges would not be known until specific hardware selection and trunking requirements are known.) Following this meeting, the responsible agency officials should be in a position to indicate whether they would want to join a 911 system. Assuming the decision is made to continue planning for the 911 system, the following problems must be addressed.

- (1) More Than One County in the Austin Metropolitan Exchange: The Austin Metropolitan Telephone Exchange serves all of Travis County plus portions of Williamson, Bastrop, Caldwell, Hays, and Blanco Counties. Thus anyone dialing 911 from these areas will reach the Austin Zone. Thus a decision must be made before implementation of a 911 system as to how these calls will be handled and how the requested emergency services will be provided. The method selected will depend on the service required and on the county in question. Possible solutions include:
 - (a) Initiate public education programs informing citizens of non-Travis County areas that they are to continue to use their present seven-digit (presumably local) numbers.
 - (b) Reach Cooperative agreements with the respective counties calling for Travis County to provide certain services on a fee basis with provisions established to review the fee structure on a regular basis.

- (c) Establish a screening process whereby the 911 operator will either contact the Travis County agency or will provide the caller with the proper local phone number.

The scope of this problem should not be underestimated.⁶

- (2) Unnecessary Delay in Handling Calls: If the 911 system is implemented in Travis County all 911 calls will be routed to the Austin central zone. (To do otherwise would require expensive modification to telephone equipment since now all calls starting with a 9 are trunked to the central zone.) This may mean that in some instances the Austin emergency center telephone operator may do little more than tell the caller to call his local police, fire, or ambulance service after providing him with the proper number or he will direct the telephone company operator to transfer the call. (Recall that unlike the telephone company operator, the Police Department will not have the capability of directly transferring incoming calls. Dedicated lines can give them the capability of relaying calls to selected agencies.) Undeniably this is an undesirable delay when compared to the direct access to emergency services provided by the standard seven-digit number (assuming of course that the caller knows the number.) Probably the best way to handle this problem is to undertake a publicity campaign in these areas via phone stickers, notices on telephone bills, notices in the phone book, newspapers, etc., stressing that standard direct access seven-digit numbers are preferable, but that 911 will get the caller the desired aid. With this procedure travelers in the area can gain access to emergency aid with 911, local citizens can continue to use the seven-digit numbers, and the 911 system can still be used either for emergency services not generally provided by the local agencies or as an alternate number should no one answer the local phone number.
- (3) Training of 911 Operators: It does not appear that the responsibilities of the individuals manning the Austin Police Department answering center will be any more complicated than they are presently or will involve substantially more training once the 911 system is implemented. The reasons for this conclusion are as follows:
 - (a) Police calls either will be handled by the Austin Police Department or will be redirected to local police/sheriff departments.

⁶Judging from the telephone numbers listed on the emergency number listing used by Austin based Southwestern Bell telephone operators, substantial cooperation and agreement already exists as to who will provide services in the overlapping areas (See Appendix Exhibit).

- (b) Many districts already call the Austin Police Department as the prime contact for ambulance service and a dedicated telephone line currently exists from the police dispatch room to the Austin Ambulance Service.
- (c) A dedicated telephone line currently exists from the Police Department to the Austin Fire Department.

Thus, the detailed questioning and follow-up calls normally associated with fire and ambulance calls will continue to be handled by the respective agency's dispatcher, not the police operator.⁷

Start Initial Planning Activities in Other CAPCO Counties. It appears that only Travis County should implement 911 on a county-wide basis at this time. Preliminary planning efforts in each county may indeed indicate that certain counties or even cities within the counties could benefit from a 911 system. The initial planning efforts should be viewed largely as a means of introducing all parties concerned to the concept of 911, as a vehicle for the understanding of the problems involved in the implementation of 911, and as an evaluation of the current emergency resources and community needs. Particular attention should be paid to the current telephone company exchanges in the area and the potential costs that a 911 system could entail. It could well be that in many instances a widely publicized seven-digit number may be as effective as a 911 system and obviously would have far less attendant costs. Details of the planning process are contained elsewhere in this report (see Chapter VII and Appendix) and are not repeated here. The point to be made is that plans for a 911 system in the other CAPCO counties should definitely not be abandoned because even if 911 is not implemented, the initial planning or exploratory efforts can provide benefits to the county, one of which may be highlighting communities that can readily benefit from and can economically implement a 911 system.

Implementation of 911 on a Selective Basis. In certain communities outside of Travis County, such as San Marcos, Taylor, or Georgetown, it may be that local conditions are quite favorable for the implementation of 911 (These favorable conditions could include high degree of self-sufficiency in

⁷ The current dedicated lines are essentially one-way lines but according to Southwestern Bell officials "pass through" capability (i.e., the caller would speak directly with the fire department) would be no problem to install.

the provision of emergency services, telephone companies or company willing to implement 911, strong initiative on the part of a key public official, civic pride, etc.) No matter how favorable the situation, the community should actively participate in regional planning efforts and critically evaluate how it may fit into a larger organization for the provision of emergency services both now and in the future. These larger considerations may affect the optimal design of the system, the placement of the answering center, and required cooperative agreements. In short, maximum value to CAPCO will result if local community leaders plan with an eye on both the larger community and on the future needs of the region. This incremental approach to 911 can prove beneficial from several points of view. First, it will guard against a blanket approach to 911 that could result in 911 being implemented in areas where it should not have been. Second, implementing the system in selected communities can have a substantial demonstration effect on other communities in the county. Third, it is conceivable that in many instances the cities that initially implement 911 will eventually be selected as the answering center for an enlarged 911 system. Thus, the experience gained during the initial, supposedly more manageable stage can prove exceptionally beneficial in later stages of development. Finally, should the decision be made to abandon the 911 system, less telephone company and local resources will have been wasted.

Monitor 911 Progress in CAPCO. In many instances local conditions may make the implementation of a 911 system infeasible in the near or distant future. Nevertheless these communities should continue to monitor the planning and implementation activities of the areas of CAPCO that have implemented or will implement a 911 system. The reasons for recommending this include the following: First, the problems addressed in the planning stages of 911 implementation are problems universally encountered by emergency service officials, such as assignment of primary and secondary areas of responsibility, providing a 24-hour coverage for emergency services, integrating with larger service areas, and solving the problem of non-congruence of political and service boundaries. Thus, the entire CAPCO region could benefit from the problem solving experience of these communities. Second, by recognizing and trying to solve many of the encountered problems now, each county will be in a better position to implement a 911 system

should legislation ever be passed calling for national implementation of a 911 system. Third, quite often one community may have already arrived at a satisfactory solution to a particular problem that is currently plaguing another CAPCO community. These monitoring activities can be actively encouraged by periodic newsletters, adding 911 items to the agendas of regularly scheduled emergency service meetings, a genuine interest by each county in the welfare of the entire region, and the publication of directories indicating the responsible officials to contact in each area should a question on a particular service or problem arise. The open discussion of problems and free-flow of ideas encouraged by these monitoring activities should help the entire CAPCO region develop a more efficient and comprehensive emergency response system.

General Comments on the Proposed System

User Group. In Chapter IV it was indicated that the benefits of a 911 system could be viewed from three perspectives--urban resident, rural resident, and traveler. How does the proposed system accommodate these three groups?

- (1) Traveler: The traveler benefits in two ways from the system proposed in this chapter. First, there will be a 911 system in Travis County. Second, he should benefit from the efforts of each county or community to establish 24-hour access to emergency services. (Implicit in this is that the telephone operator will be given the appropriate phone numbers/agencies to contact.) Response time could be further reduced for the traveler by providing means by which the traveler would be better able to tell the operator/911 center precisely where he is calling from. (See Chapter VII.)
- (2) Urban Resident: Since the urban resident generally lives closer to the provider of emergency services, he is in a better position than a rural resident to benefit from the potential time savings generated by a 911 system. The proposed system recognizes this and only the urban county of Travis is recommended for the near-term implementation of 911.
- (3) Rural Resident: In most cases the response time of rural emergency services is simply too long to effectively benefit from any decrease in input time provided by a 911 system. The proposal recognized this by calling for only the selective implementation of 911 with an accent on having rural areas improve or establish 24-hour access to emergency services before they implement 911.

Sensitive to Local Conditions. The emphasis of the plan proposed in this chapter is on each community or county evaluating their specific needs and then tailoring their system, with or without 911, to these needs. This approach should lead to a system of potentially more benefit to the communities as well as a system that will more easily win the support of local officials and residents.

Federal Grants. Although the proposed system does not call for the implementation of 911 throughout the CAPCO region, the fact that it calls for the implementation of a 911 system in Travis County (about two-thirds of the population in CAPCO) as well as the initiation of planning activities in the rural communities should be adequate to win Federal funds.

Services to Include in the 911 System. The proposal indicates or implies that police, fire, and ambulance services should always be included in the 911 system. The fact is that the specific services to be included will depend on the local situation. Once the 911 system is implemented it is easy to expand the services included by either adding dedicated lines or maintaining a list of emergency phone numbers, such as suicide prevention, explosive detonation crews, and poison control.

Summary

At the present time Travis County appears to be in excellent position to benefit from a 911 system due to the already relatively short emergency response times, generally higher level of confusion surrounding the proper number to call in case of an emergency, fortunate telephone company equipment arrangements, and the efficiency with which 911 calls could be handled by the Austin Police Department. In general, the other CAPCO counties would probably not benefit from the implementation of a 911 system at this time. Nevertheless, it is recommended that these counties initiate planning activities for a 911 system (largely to indicate feasibility), strive to improve the 24-hour availability of emergency services, and monitor the progress other counties make in solving 911-related problems.

CHAPTER VI

BASTROP COUNTY

This chapter focusses on a rural county, Bastrop County,¹ in an attempt to indicate the preliminary analysis that should be done before detailed planning for a 911 system is undertaken. Not every county will have the same problems or opportunities as Bastrop County, but each county must answer the following basic questions:

- (1) How are emergency services currently provided and how does the citizen contact the agency?
- (2) What contribution can a 911 system make to the provision of emergency services in the county?
- (3) How much will it cost to achieve these benefits?

Using the criteria cited in Chapter IV, this chapter analyzes two 911 system proposals for Bastrop County, and tries to answer the three questions. The chapter concludes with an opinion on whether Bastrop County should implement a 911 system.

Bastrop County--Overview

County Description. Bastrop County (see Appendix for Map of Bastrop County) is an approximately baseball diamond-shaped county of 17,297 persons (1970) and 885 square miles located to the east and southeast of Travis County. The three principal cities with their 1970 population and location are Bastrop (3,112, center of the county), Elgin (3,832, north corner), and Smithville (2,957, southeast of Bastrop near the Fayette County border.) The CAPCO Criminal Justice Plan² reports that:

¹Bastrop County was selected because it was learned that Bastrop County is seriously considering a 911 system.

²Capital Area Planning Council, Criminal Justice Plan, 1972-1976, (1971), p. 19.

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Three-fourths of the inhabitants are engaged in agriculture with most income coming from the raising of livestock. Bastrop County has gently rolling hills, "lost pines" and other various trees, and is bisected by the Colorado River.

Law Enforcement Services. Law enforcement in Bastrop County is provided by a total of 24 officers. As noted by the CAPCO Criminal Justice Plan³

this includes six from the Sheriff's Office, five from the City of Bastrop Police Department, four Elgin policemen, four constables (however, only two are active), four DPS (Department of Public Safety) officers, two Smithville policemen and one game warden.

Fire Departments. Bastrop County is served by three all-volunteer fire departments located in Bastrop, Elgin, and Smithville.

Ambulance Services. The provision of ambulance services is in a state of flux at the moment, but it appears that the system will maintain the funeral homes in Elgin, Bastrop, and Smithville as the providers of the service, with financing coming from the cities although there is increasing pressure for the county to assume a greater financial role.

Telephone Companies and Exchanges. Bastrop County is serviced by four telephone companies with a total of eight exchanges. They are Southwestern Bell through their Austin, Elgin, Bastrop, and Smithville exchanges, Continental Telephone Company's McDade and Paige exchanges, the Rocky Creek exchange of Guadalupe Valley Telephone Co-operative and General Telephone Company of the Southwest's Northrup exchange.

Current Methods of Contacting Emergency Services. The current methods of contacting emergency services in Bastrop County are the standard seven-digit phone call to the appropriate agency and the call to the telephone operator. No matter where a citizen calls from in Bastrop County, if he dials the operator he will be answered by a Southwestern Bell operator stationed in Austin. If the operator is asked for emergency assistance in Bastrop County, he will look up the appropriate number from the card in

³Ibid., p. 19

front of him and either provide the caller with the number or, which is more likely, he will connect the calling party directly to the emergency agency.⁴

Evaluation of System Proposals for Bastrop County

The criteria discussed in Chapter IV (1. potential decrease in total response time, 2. degree to which the system addresses the needs of the community, 3. costs of the system, and 4. adaptability of the system) are used here in evaluating two system proposals for Bastrop County. The first is a county-wide system with Bastrop as the answering center and then the possibility of a city or cities implementing a 911 system in Bastrop County is explored.

Make Bastrop the 911 Reporting Center for all of Bastrop County. As part of the CAPCO law enforcement command and control voice radio communication program, the city of Bastrop will establish 24-hour-a-day answering capability with a control station located in the Sheriff's office in the Bastrop County Court House. The following sections evaluate a 911 system that has the County Court House as the 911 reporting center.

- (1) Potential decrease in response time; It is difficult to see how this 911 system would substantially, if at all, reduce response time. It seems that the answering center would do little more than relay the request for aid to the appropriate local emergency agency. (This is undoubtedly the case for ambulance and fire services, at least given the present configuration of those services in Bastrop County.) This is essentially the same function currently provided by the Southwestern Bell telephone operators and is certainly slower than the direct call to the required emergency agency. In rural areas there generally is less confusion as to the proper agency to call and the seven-digit number is more widely known, so the reduction in response time associated with a potential reduction in citizen confusion should be largely discounted. It is true that the city of Bastrop will be better able to coordinate activities and perhaps seek additional aid, but this would appear to be an advantage of the radio communication system that will continue to exist with or without

⁴After handling the emergency call the operator will fill out his call ticket to provide for long distance billing and/or evidence that the telephone company did take immediate action on the request for emergency aid.

a 911 system. Finally, even if a sound argument could be structured demonstrating a slight decrease in response time, it probably would be insignificant compared to the time the agency takes to get to the scene once it is notified its services are required.

- (2) Needs of the Community: The following paragraph from CAPCO's Criminal Justice Plan describes the law enforcement needs of Bastrop County:

The law enforcement system in Bastrop County is functioning adequately. There appears to be no special problems regarding juvenile cases, drug control or any trends of criminal activities. Good coordination exists among the county and the city agencies operating in the area; however the need was cited for additional DPS officers in areas such as Smithville (which has no DPS units) to aid primarily in traffic control.⁵

A summary of the needs of the fire and ambulance services in Bastrop County would be the same as for most rural areas; too much area to cover when the services are needed and not enough overall utilization of the services to justify increased capital expenditures for additional equipment. In short, decreased response time would certainly be welcomed, but as noted above it is difficult to see how this 911 system would provide meaningfully shorter response times. Perhaps Bastrop would derive greater benefit from capital expenditures for improved emergency services than for this 911 system.

- (3) Costs:⁶ Unfortunately, none of the telephone equipment factors cited in Chapter V as favoring Travis County exist in Bastrop County. First, there are four telephone companies operating in Bastrop County. (Southwestern Bell and Continental Telephone seem eager to help with 911 planning. Guadalupe Valley Telephone Cooperative did not respond to a letter requesting information and no further attempt was made to reach them.) Second, there are eight telephone exchanges in Bastrop County; thus, in the non-Bastrop exchanges, a call to Bastrop is a long distance call. Third, there are no telephone exchanges in Bastrop County starting with a 9; therefore, none of the telephone company central offices is capable of detecting a 9 in the first position. The primary

⁵Capital Area Planning Council, Criminal Justice Plan, 1972-1976, (1971), p. 19.

⁶The cost figures given in this section should be viewed as nothing more than educated guesses based on discussions with telephone company officials from Southwestern Bell and Continental Telephone. The existence of the Northrup Exchange was unknown at the time the cost estimates were made, but the estimates should still be fairly good.

cost factors would be two--the costs of modifying the central office equipment in each exchange to detect 911 and then the cost associated with routing the calls to the city of Bastrop. Southwestern Bell and Continental Telephone will absorb the costs of modifying their central office equipment. (Depending on the costs involved, the other companies may not be willing to do the same.) In the author's opinion, this central office modification is where the moral obligation (based on past public statements) of the major telephone companies ends. With the modifications completed the digits "911" would be free for local use and the community should have to pay for having the calls routed to their selected answering center. The costs to Bastrop County for having the calls routed to Bastrop would have to be negotiated with the appropriate telephone companies. At the present time, possible alternatives and their respective costs for implementation include, but certainly are not limited to, the following:

- (a) The cost of routing calls from the Elgin, Bastrop, and Smithville exchanges to Austin would be absorbed by Southwestern Bell. Foreign exchange service⁷ would then be employed to direct the calls to the answering center in Bastrop. (A cost of approximately \$110 a month.) The other non-Bell exchanges would probably ask for foreign exchange service to Bastrop at a cost of approximately \$180 per month. Total cost for this alternative: \$290 per month.
- (b) Non-Bell exchanges tie into Bell equipment and Bell absorbs the cost of routing the calls to Austin. The charge to Bastrop County would be the cost of a foreign exchange line from Austin to Bastrop--approximately \$110 a month.
- (c) Each exchange could be tied to Bastrop via a foreign exchange circuit for a cost of approximately \$290 per month.

The costs cited above apply only to the trunking costs and do not include equipment installation costs for reporting center equipment. (Bastrop would probably need little more than the standard telephone line for their reporting center.) The specific costs of the 911 system would depend on the methods selected by the phone companies to route the calls to Bastrop. There is the possibility that the costs to Bastrop County would be less if they were to wait since Southwestern Bell may absorb trunking costs

⁷ Foreign exchange service is the name given to dedicated trunks established between two points not in the same exchange. Costs may vary from company to company but Southwestern Bell charges \$2.15 for the first quarter mile and \$1 for each additional quarter mile. (Distance is direct air mileage.)

through planned expansion of their physical plant. (Southwestern Bell plays a key role in the trunking costs since they own most of the phone lines in Bastrop County and have the largest capital base.) In summary, the costs of a 911 system for Bastrop County with the city of Bastrop as the answering center, if implemented in the near future, would probably range from approximately \$1,400 to \$3,600 per year.

- (4) Adaptability: This system would be highly adaptable. Once the capability to detect 911 is established in each central office, the system could be readily adapted to changing requirements such as changing the location of the answering center. In this case, it is difficult to see the changes as being other than one of the following: (1) Austin being designated as the answering center; (2) each exchange reporting to the nearest city; or (3) the answering center being relocated to a different location in the city of Bastrop. The system under consideration can easily accommodate these changes without sacrificing substantial past investments by Bastrop County. A factor to keep in mind, however, is whether or not the phone companies will require some sort of termination agreement in their initial contract in order to protect their investment and, if they do not now, whether or not they will do so if Bastrop County officials request a change in the system. Questions of this nature must be explored with telephone company officials. In summary, although this proposed 911 system would be highly flexible and would cost from \$1,400 to \$3,600 per year in telephone company billings, it promises little reduction in emergency response time and may not be addressing the real needs of Bastrop County.

911 System With Bastrop, Elgin, and Smithville as Answering Centers.

From the standpoint of monthly charges for the telephone trunking, a 911 system with Elgin, Bastrop, and Smithville as the answering centers would be minimal since the charges would be the basic flat rate charged for home phones. Should Rocky Creek, Paige, and McDade exchanges be included, the foreign exchange service rates would probably apply. In this system design the cost constraint would be the cost of establishing and maintaining a 24-hour answering center in each of the three cities:⁸ why should a town of 3,000-4,000 people hire additional men to answer a phone for perhaps one to three calls a day--especially when the emergency agency can be contacted almost as quickly through the telephone operator? A further

⁸ By even the most conservative estimate, the costs of establishing three separate 24-hour-a-day reporting centers would exceed the \$1,400-\$3,600 estimate derived for a county-wide 911.

problem is that in general the more 911 systems introduced in a given geographic area, the greater the difficulty of coordinating emergency services. For example, assume both the Bastrop and Elgin exchanges develop 911 systems. In this situation, many people in the Bastrop exchange live much closer to Elgin than Bastrop and yet would reach Bastrop with their 911 calls. It is harder to handle this problem with separate 911 systems than it would be for a county-wide system in which the closest emergency agency would automatically be contacted by the answering center. In short, the author sees no advantages to this "local 911 system" other than the fact that it forces local communities to further develop their 24-hour-a-day response capability for all emergency services.

To take care of the possibility that the decision will be made to pursue further the implementation of a 911 system in Bastrop County with Bastrop as the answering center, the following five issues are some of the problems that would have to be overcome. This short list of problems does not exhaust the list of those that will face county officials as they plan a 911 system (See the planning checklist in the Appendix and Chapter VII for more potential problem areas.), but these five problem areas seem to be key issues in Bastrop.

- (1) Telephone Exchanges Overlapping County Boundaries: Decisions must be reached as to how calls will be handled when the caller is calling from another county but is still in the local telephone exchange. The most extreme example of this occurs in the Elgin Exchange in which one-third of the area is in Travis and Lee Counties. (The Smithville exchange extends into Fayette County, but to a lesser extent.) Possible alternatives include:
(a) work out cooperative agreements with neighboring governments;
(b) Ask the caller to contact the proper agency; and (c) Educate the population to continue to use the current seven-digit phone number for the appropriate agency.
- (2) Residents Served by Foreign Telephone Exchanges: The only two instances known in which the telephone exchange servicing residents of Bastrop County is in another county, are the cases of the Austin Telephone Exchange (Southwestern Bell) and the Northrup Exchange (General Telephone Company of the Southwest.) However, it may be that the same situation exists close to the Caldwell border. Where this is the case, the residents will probably have to continue to use the present seven-digit telephone numbers.

- (3) Who Will Pay for the System? The Criminal Justice Council will probably pay the costs for the first year or two, but eventually local funding must be used. Then the individual cities or citizens on a county-wide basis will have to be convinced to pay for it.
- (4) Provision of Emergency Services: Precise designations of primary and secondary areas of responsibility must be reached and it must be clear who has dispatch authority over the emergency services.
- (5) Compensation for Services Rendered: When an agency is called upon to render services beyond its normal range of duties, means should be established to compensate the agency for services rendered. Similar procedures may have to be established to ensure that all ambulance operators receive payment for all the runs they make.

911 and 24-Hour Reporting Center. As mentioned in Chapter V, a clear distinction should be made between the advantages of providing a 24-hour-a-day emergency reporting center and the advantages of a 911 system. In some instances it may be that Bastrop is in the best position to know the current availability of county resources, can provide the means to marshal additional aid, and has the authority to dispatch certain services. As such, all of Bastrop County could benefit from having a 24-hour reporting center in Bastrop, but this capability can be established without implementing a 911 system.

Recommendation

Bastrop County should not implement a 911 system at this time. A local system would be too expensive in terms of establishing many reporting centers and it does not seem to be a substantial improvement over the present seven-digit or dial-the-operator systems. With a Bastrop-centered county-wide 911 system it is difficult to see that the reporting center operator would do any more than is currently done at no charge by the telephone operator, i.e., contact the emergency service and relay the information. Further, under the proposed 911 system the caller would not talk directly to the emergency agency, while he does so now under both the operator-assisted and direct-dial systems. Even the most optimistic estimates for a county-wide system place the cost at \$1,400 per year for benefits that are questionable, at best.

Instead of implementing a 911 system at this time, it is recommended that Bastrop County undertake the following:

- (1) Establish and/or improve 24-hour-a-day response capability for police, fire, and ambulance services.
- (2) Undertake campaigns to increase public knowledge of local emergency telephone numbers, perhaps to include information stickers for each phone in the county. Public phones/booths along highways should be marked to include the location of the nearest access road.
- (3) Encourage the use of the telephone operator if there is any doubt at all concerning the agency or phone number.
- (4) When the 24-hour-a-day reporting center is established in Bastrop City, wide publicity should be given to both its existence and its telephone number.
- (5) After Bastrop County has had more experience with the problems inherent in a centralized emergency reporting center, it should be in a better position to both evaluate and perhaps implement a county-wide 911 system.

CHAPTER VII

PLANNING AND IMPLEMENTATION CONSIDERATIONS

The previous chapters have focussed on the definition of a 911 system, provision of emergency services in the CAPCO region, geographic and demographic characteristics of the region, and a proposal for a 911 system for the ten county CAPCO community. This chapter will highlight the planning process as well as such implementation activities as publicity, timing, operator training, checklist preparation, and system monitoring.

The Planning Process

In October 1972 The Franklin Institute Research Laboratories published "911 A handbook for Community Planning."¹ In it is presented a three-page checklist entitled "911--A Checklist for Action," a copy of which is provided in the appendix to this report. The checklist is fairly comprehensive and easily understood, and the following comments on planning are meant to be additions to the considerations included in that checklist rather than proposed changes.

Is the Implementation of 911 Inevitable? An April 1, 1974 article in Telephony (a telephone company trade journal) concluded that "TELCOS (telephone companies) soon will be legally required to supply a universal emergency telephone number throughout the U.S. That number will be 911."² Providing the number does not assure that it will be used. Bell Telephone, which serves approximately eighty percent of the phone subscribers in the United States, announced in 1968 that it would make 911 available nationwide, yet only about ten percent of the citizens in this country have access to a

¹The Franklin Institute Research Laboratories, 911 A Handbook for Community Action, Philadelphia, 1972.

²Dennis M Rooney, "TELCOS and 911 Emergency Service--Facts and Issues," Telephony, (April 1, 1974), 27.

911 system. To help stimulate local initiative, the state governments of New York, California, and Massachusetts have passed laws requiring implementation of 911 and several other states are likely to follow soon. The Federal government is also encouraging the implementation of 911 by making it a prerequisite for obtaining certain Federal funds. As more citizens are covered by 911 and as 911 is more widely publicized, local pressure for a 911 system may increase.³ So, if only to prepare themselves for the inevitable, local communities should start initial planning for 911.

Who Should Provide the Initiative for 911? The author has received the impression that most of the communities in the CAPCO region have agreed to the principle of 911 without fully understanding the following: actual benefits of the system, difficulties of implementation, who is to help design the system, importance of local initiative and cooperation, and costs of the system. In the author's opinion each county government should appoint a task force to consider in detail the problems and opportunities that a 911 system presents for their county. Such a task force would avoid the problem of accepting a system largely imposed by others that might operate at a level of efficiency far below what it could have been if greater efforts had been exerted at the local level to detect and help alleviate potential problem areas.

Dealing with Telephone Companies. Although most of the smaller independent phone companies are perhaps less than enthusiastic about the prospects of universal implementation of 911, it is the author's opinion that they realize that 911 is inevitable and will do all they can to help reduce implementation problems.⁴ The phone companies that replied to a letter sent to them requesting information on 911 generally indicated that the system would be welcomed, "but it would take a tremendous amount of cooperation and co-ordination involving many people."⁵

³This is especially true when citizens are likely to be aware of the supposed benefits of the system and not the costs or associated problems.

⁴Southwestern Bell, the largest phone company in the CAPCO region, is committed to implement 911 upon request.

⁵Colorado Valley Telephone Co-Op, op. cit. 2.

Telephone company officials can provide detailed information on present equipment configurations, modifications required for 911, system alternatives, subscriber costs, etc. In approaching these officials every attempt should be made to create an atmosphere of respect and cooperation that will hopefully lead to a better understanding of the problems of the proposed 911 system and will generate possible solutions to these problems. Local planners should guard against the possibility of building a system that is actually far more sophisticated than they really need and they should learn all they can about possible hardware so they can effectively communicate with telephone company officials.

Selling 911 to the Service Agencies. In some instances a police department may ask why they should have to handle calls for the fire department or a fire department may refuse to join a 911 system. The reluctance of certain agencies to participate in the 911 system may have to be overcome. Each situation varies due to leadership personalities, service agency autonomy, funding for the agency, perceptions of the 911 system, etc. In trying to sell the 911 concept to local emergency service organizations the following points should be stressed:

- (1) The common denominator of all their efforts is to improve the welfare of the community.
- (2) Telephone companies will gladly conduct traffic studies to determine how many calls various agencies are actually receiving. Such factual information may prove valuable in settling disagreements that may be turning more on emotion than on fact.
- (3) The 911 system is a flexible system and can be virtually tailor-made to fit the needs and desires of the community and emergency agencies.
- (4) The autonomy of each emergency service organization will remain intact. Unless designed otherwise, the dispatch function will be retained by the emergency agencies. Control of manpower and resources will not necessarily be placed in the hands of the 911 operator.
- (5) The 911 system introduced need not be an inflexible system. Periodic review sessions will be or could be held with responsible officials from the affected agencies in attendance.

Public Meetings. Much can be said in favor of holding well-publicized public meetings on the proposed 911 system. Public perceptions and possible misgivings about the system can be aired and can positively influence the

system design and indicate likely candidates for key elements in future publicity campaigns. Especially in smaller communities, public meetings can do much to uncover the informal methods currently employed to cope with emergency situations. These informal methods can be evaluated and augmented, reinforced, or perhaps replaced in the final system proposal. At the very least, it is far better to get citizen involvement before the fact in the form of open discussion than after the fact in the form of frustration, dissatisfaction, and/or by-passing of the 911 system.

Handling of the 911 Call. The key to the success or failure of the system will be how the call is handled once it reaches the 911 center. If the operator does little more than interrogate the caller, record the information, call the appropriate agency, and relay the information, it is apparent that this would involve more time than a direct call to the appropriate agency and probably more time than the sequence of events that would start with a call to the telephone operator. Dedicated phone lines from answering centers to responsible agencies may alleviate part of this problem, but these lines can be expensive.⁶ The flexibility available in the design of the answering center is substantial. (See Appendix--"911-A Checklist for Action," Phase III, item 7.) The design selected by local officials will vary with the particular circumstances, but before 911 is implemented officials must be convinced that the system will not actually increase response time through inefficient handling of 911 calls.

Implementation Considerations

Time Required to Implement 911. Obviously the time required to implement a 911 system will vary with the particular circumstances in a given community, but Table 11 provides insight into the stages of implementation and the elapsed time and activities generally associated with each stage.⁷

⁶Monthly charges for dedicated lines installed by Southwestern Bell Telephone are \$2.15 for the first quarter mile and \$1.00 for each additional quarter mile. (Mileage measured by air miles.)

⁷The Franklin Institute Research Laboratories, op. cit., p. 51.

TABLE 11. EXAMPLE OF A POSSIBLE 911 IMPLEMENTATION SCHEDULE⁸

<u>Step</u>	<u>Time Required (weeks)</u>	<u>Activity</u>
1	4 to 15	Decision to consider 911 system Contact with telephone company Convening of planning group Conduct of preliminary study of needs Design decisions
2	6 to 16	Negotiations with neighboring communities, if necessary Cooperation agreements among service agencies Establishment of procedures for handling 911 calls
3	8 to 52	Telephone equipment modification 911-operator training
4	1 to 4	Publicity campaign Start of 911 service
<hr/>		
Total	19 to 87	

⁸Dennis Rooney, op. cit., p. 28, using critical path analysis, derived a time estimate of 46 months from the initial consideration of a 911 system to the first day of operation. This is approximately twice the longest estimate in Table 11.

Training of Operators. Depending on the location and proposed manning of the 911 emergency answering center, the training of operators can range from a minimal task of procedural review to wholesale training of newly recruited personnel. No matter what training is required, it is important that the operators be reasonably competent before the 911 system is inaugurated. If they are not, the community can quickly lose confidence in the system and there is the possibility that needless loss of life or property will result. Probably the greatest problem facing the operator will be the obtaining of needed information from the caller. Operator trainees should be given practice emergency calls to help develop their competence under pressure and to try to aid them in developing a professional, reassuring approach in obtaining emergency information. No matter how self-explanatory or all-inclusive the checklists attempt to be, the operator may often have to draw upon rather detailed knowledge of available emergency services. Thus a substantial portion of the operator training program should include information on types of emergencies and agencies that can provide needed assistance. In some instances it may be desirable to provide the operators with rudimentary training in first aid such as what to do if someone is choking on a piece of food, resuscitation procedures, or what to do in case of shock. In this fashion the operator could prove to be an invaluable extension of the more traditional emergency services.

Preparation of Checklists. Closely associated with operator training is the preparation of and practice with emergency checklists. As implied earlier, checklists currently employed by various agencies (police departments, fire departments, ambulance companies, phone companies, medical associations, hospitals, etc.) are probably the most logical source of aid in preparing 911 checklists. Local considerations such as who provides the specific emergency service, is the operator a relay or transferer of calls, the time of day, etc. could strongly influence the scope and character of the prepared checklists. For example, if the operator were primarily a transferer of calls he would be more concerned with the general type of emergency (so he could select the proper agency) than with the more specific information he would need if he were a relay of information to the appropriate agency. Surely not every emergency situation can be foreseen, but by having a well-indexed compilation of checklists covering the

most likely emergency situations, much operator confusion can be eliminated. As these checklists are employed in operator training sessions, trainee suggestions for improvement should be actively solicited. Finally, procedures should be established to provide for periodic review, evaluation, and updating of the operator checklists.

Timing--When Should 911 be Started?⁹ In most instances a somewhat higher than normal level of emergency calls is made during the period immediately following introduction of a 911 system. Some of these calls are the result of nonemergency cases being called in as a result of a misunderstanding of the true nature of the 911 system. Others are the result of citizen curiosity as to how the system would work or even if it would work. It is important for the initial success of the 911 system that the system be able to cope with this higher level of usage. Failure to do so could lead to citizen suspicion of the system and continued use of the seven-digit numbers. At the very least the public will have to be educated to accept possible problems during the initial stages, but this ignores the possible harm that could be caused by delays that could perhaps have been avoided.

One possible solution to this problem is to introduce the 911 system during a period in which there has been a historical low point in usage of emergency services. Generally speaking the number of 911 calls increases during the summer months and during the holidays. Thus, introduction shortly after January 1st would seem to be a logical choice. Surveys of the local emergency agencies can perhaps provide insight into the best time to start the 911 system. Local telephone companies will probably be quite willing to and capable of conducting service usage surveys. Another consideration may be the distribution date of the local telephone directory.¹⁰ A publicity campaign that stresses the importance of using 911 only for emergency situations can do much to cut down on the level of nonemergency calls. But no matter how extensive the campaign, regional planners should

⁹Rural communities should not be as concerned as urban communities with this initial surge in demand.

¹⁰Mr. John Thompson, marketing representative for Southwestern Bell in Austin, provided this consideration.

be prepared for an initial surge in 911 calls. This author was unable to locate information on the duration of this period of higher than normal usage of 911, but given a strong pre and post-implementation publicity campaign aimed at stressing the using of 911 only for true emergencies, this period should probably last no longer than a month.

Publicity. It is generally recommended that the publicity campaign for the 911 system not begin too far in advance of the starting date. (Table 11 indicates one to four weeks before implementation is far enough in advance.) In fact, many communities do the bulk of their advertising after the system has been implemented. The methods selected for publicizing the 911 system are unlimited. It is important that the citizens understand that the number is designated for emergency situations only and that it is not to be viewed as a replacement for the seven-digit number for calls of a more routine nature. In those instances in which seven-digit numbers are being retained for certain emergency services, a card with the appropriate agencies and their phone numbers can be provided to each family in the community. Use of local public officials in promotional radio and television spots can do much to publicize the project as well as probably win greater acceptance of the system by these local officials.

Pay Telephones. Pay telephones often present special problems for 911 planners. First, most pay phones have not yet been modified to accept toll free calls to the operator or toll free 911 calls. Long range scheduled improvements by Bell Telephone should alleviate this problem. A problem with a more immediate solution is that often, especially during emergency situations, the caller is not really sure of where he is calling from. He may know the street or expressway, but is unsure of the correct address or nearest highway, entrance to the main road, or interchange. Although certainly not critical in magnitude, this problem can be simply solved by providing the necessary information at the telephone site either with a sign on the phone box or booth or with a stencil of some sort on the phone box or on the phone itself. Providing this information, although not directly tied to the 911 program, can provide favorable publicity for the program as well as perhaps provide a vehicle for the involvement of local service organizations or citizen volunteers.

911 in Operation-Monitoring Activities. Careful monitoring of the system can provide necessary information for system improvement and effective preparation for and adaptation to changing service requirements or environmental factors. Monitoring activities may be necessary for the establishment of manning levels, interservice cooperation agreements, fee structures for service rendered, changes in publicity programs, new equipment studies, and campaigns against nuisance calls. Care must be exercised to guard against data overload. Certainly the information requirements of a New York City differ from those of a Caldwell County. Yet, much can be gained from investigating the data categories employed by other communities while remaining sensitive to the specific information needs of the region/community in question. More as a means of stimulating local thought on the matter as opposed to a presentation of a supposedly exhaustive list of data categories, the following general areas are presented:

- (1) type of emergency;
- (2) distribution of calls by day of week, hour of day, holiday, etc.;
- (3) nonemergency calls by number and type;
- (4) emergencies for which operators need more training;
- (5) adequacy of answering center manning; and
- (6) a log of procedural problems or bottlenecks the operators perceive.

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APPENDIX

A RESOLUTION

THE STATE OF TEXAS I
County of LEE I

WHEREAS, the City of Giddings desires to participate in areawide system of emergency services; and

WHEREAS, the City of Giddings understands that the system of emergency services will include: emergency medical vehicles, para medical personnel services, centralized communications, and records keeping services, and the probable establishment of a universal emergency number such as "911" and

WHEREAS, the City of Giddings understands that the initial installation and purchase of appropriate materials will be paid for through contract to CAPCO from the Department of Health, Education and Welfare;

THEREFORE, be it resolved that the City of Giddings will support the development of an emergency system within the Capital Area State Planning Region.

Mayor

Alfred W. Zoch
Alfred W. Zoch

City Manager

W. O. Keaghey
W. O. Keaghey

City Councilmen

Leonard A. Krieger
Leonard A. Krieger

Robert L. Placke
Robert L. Placke

Passed on this 3rd day of April, 1972

emergency numbers

CITY OF AUSTIN



FIRE 476-4333

Administrative & Other Fire Dept. Calls 472-9201

TRAVIS COUNTY FIRES 472-9241



POLICE 476-8311

Administrative & Other Police Dept. Calls 476-3541

Emergency Ambulance Only See "Ambulance Service" in the Yellow Pages

Emergency Hospital See "Hospitals" in the Yellow Pages

Texas Department of Public Safety
Highway Patrol 452-0331

County Sheriff 472-9285



U.S. Secret Service 397-5103

Federal Bureau of Investigation 478-8501

IF NO ANSWER DIAL
SAN ANTONIO, TEXAS 225-6741

FIRE

POLICE

DOCTOR

OFFICE

HOME

AMBULANCE

EMERGENCY MEDICAL

EMERGENCY CALLS ON PARTY LINES WARNING

The law of the state of Texas provides that any person who shall willfully refuse to immediately relinquish a party line when informed that such a line is needed for an emergency call to a fire department or police department or for medical aid or ambulance service, or any person who shall secure the use of a party line by falsely stating that such a line is needed for an emergency call, shall be guilty of a misdemeanor. The law defines an "emergency" as a "situation in which property or human life are in jeopardy and the prompt summoning of aid is essential."

LOCALITY	FIRE	SHERIFF	LOCALITY	FIRE	SHERIFF
AUSTIN LAKE ESTATES	263-2121	472-9285	MANCHACA	282-1144	472-9285
BEE CAVES	263-1775	472-9285	MANOR	272-5522	472-9285
BEE CREEK	Days 892-0515	472-9285	OAK HILL	892-0252	472-9285
	Nights 472-9285		PFLUGERVILLE	251-4100	472-9285
BLUFF SPRINGS	472-9241	472-9285	PILOT KNOB	472-9241	472-9285
BRIAR CLIFF	264-1970	(POLICE) 264-1776	POINT VENTURE	267-1151	472-9285
	(If No Answer) 264-1776		RIVER HILLS	472-9241	472-9285
C-BAR	263-2121	472-9285	ROLLINGWOOD	472-9241	(POLICE) 327-0015
CEDAR PARK	Days 258-1762	(POLICE) 258-2800	ROUND ROCK	Days 255-3777	(POLICE) 255-3692
	Nights 259-1278			Nights 255-3909	
CREEDMOOR	472-9241	472-9285		(If No Answer) 255-3828	
DEL VALLE	472-9241	472-9285	SANDY CREEK	259-0062	472-9285
ELROY	472-9241	472-9285	TRAVIS COUNTY		
GARFIELD	472-9241	472-9285	FIRE CONTROL	472-9241	472-9285
HUDSON BEND	266-1775	472-9285	VOLANTE	258-1114	472-9285
JONESTOWN	267-1551	472-9285	WEST LAKE HILLS	327-0261	327-0015
JOLLYVILLE	See Round Rock	259-1717		(If No Answer) 327-0224	
LAGO VISTA	267-1143	472-9285	WILLIAMSON COUNTY		
LAKE TRAVIS	472-9241	472-9285	(GEORGETOWN)	863-2555 (GEORGETOWN) 863-2114	
LAKEWAY	261-6161	472-9285		(If No Answer) 863-5880	
LEANDER	259-1492	259-1717			
	(If No Answer) 259-1353				

UNIT I 2-74

McDADE 273
 AMBULANCE (Elgin) 285-4616
 FIRE (Elgin) 285-4444
 Night & If by -Fire only 285-4025
 SHERIFF (Bas.) 321-2227 or 321-2276

OAK HILL 892
 AMBULANCE 476-8311
 FIRE (Day) 892-0515 (Night) 892-0252
 SHERIFF 472-9285

PAIGE 253
 AMBULANCE - GIDDINGS 713- 542-3113
 FIRE - BASTROP 321-2323
 FIRE - GIDDINGS 713- 542-3131
 SHERIFF BASTROP 321-2227 or 321-2276

PFLUGERVILLE 251
 AMBULANCE 476-8311
 FIRE 251-4100
 SHERIFF (AUS) 472-9285

ROCKY CREEK 839
 AMBULANCE (SMVL) 237-2425
 FIRE (SMVL) 237-2525
 SHERIFF (BAS) 321-2227 or 321-2276
 SHERIFF (LaGrange) 713- 968-3856

ROUND ROCK 255
 AMBULANCE 255-3692
 FIRE 255-3777
 (NIGHT) 255-3909
 POLICE 255-3692

SMITHVILLE 237
 AMBULANCE "MARRS" 237-2425
 PENDERGRASS & PEOPLES 237-2365
 FIRE 237-2525
 POLICE 237-2311
 SHERIFF (Bas) 321-2227 321-2276

WIMBERLEY 847
 AMBULANCE (SMCS) 392-2424
 FIRE (only) 847-2345
 SHERIFF 392-2626

ALL COIN SERIES

243 80XX	282 91XX	453 91XX	477 04XX
247 70XX	288 89XX	453 92XX	477 05XX
251 93XX	327 90XX	453 93XX	477 06XX
255 77XX	345 90XX	453 94XX	478 01XX
258 96XX	385 90XX	453 95XX	478 02XX
259 81XX	385 99XX	453 98XX	478 03XX
263 90XX	441 90XX	453 99XX	478 04XX
263 91XX	442 90XX	472 00XX	836 98XX
264 07XX	442 91XX	472 03XX	836 90XX
266 91XX	442 92XX	472 04XX	836 99XX
267 72XX	442 99XX	477 01XX	892 98XX
272 84XX	451 90XX	477 02XX	926 90XX
276 79XX	453 90XX	477 03XX	926 98XX
			926 99XX

SWITCH ROOM NUMBERS

Evergreen	385-0710	E.S.S.	472-1110
Gl - HO	452-9597	TW2 and BU8	892-0993
Greenwood	478-9583	836	836-0927
Hickory	442-1413	836 TBLSTA	580 or 459-6503
Jollyville	258-1649	327	327-1552
Walnut	926-1840	345	345-1186

MOB PH. SERIES AUSTIN RADIO PH.

474-4000 - 99

476-6707

474-4900 - 99

MOB REPAIR SHOP 472-3359

AUS.SPECIAL BILLING#

042	3000	6999	059	6700	6799
043	0000	3199	077	0000	9999
050	2000	7399	081	4000	4299
051	1000	2999	081	5000	5499
051	4000	4099	083	0000	2049
051	6000	6049	083	6000	6049
052	0000	9999	085	8000	8199
053	0250	7999	098	0000	1999
053	1150	1199	098	2000	2799
059	1000	3999	098	3000	9999

ONE WAY COINS

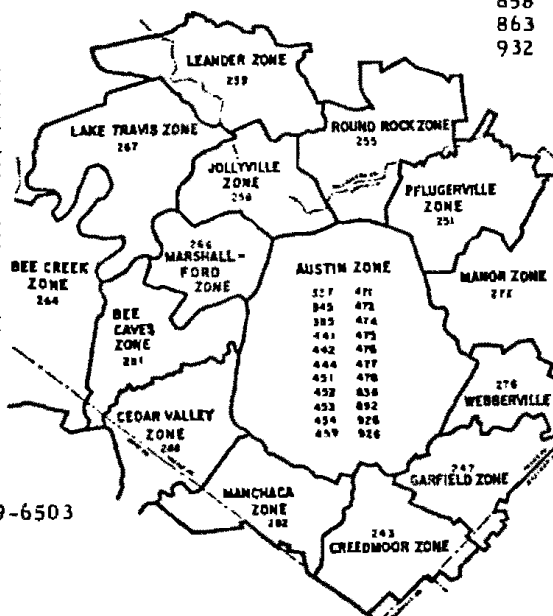
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5th Digit Check1974 Credit Card Code Letters

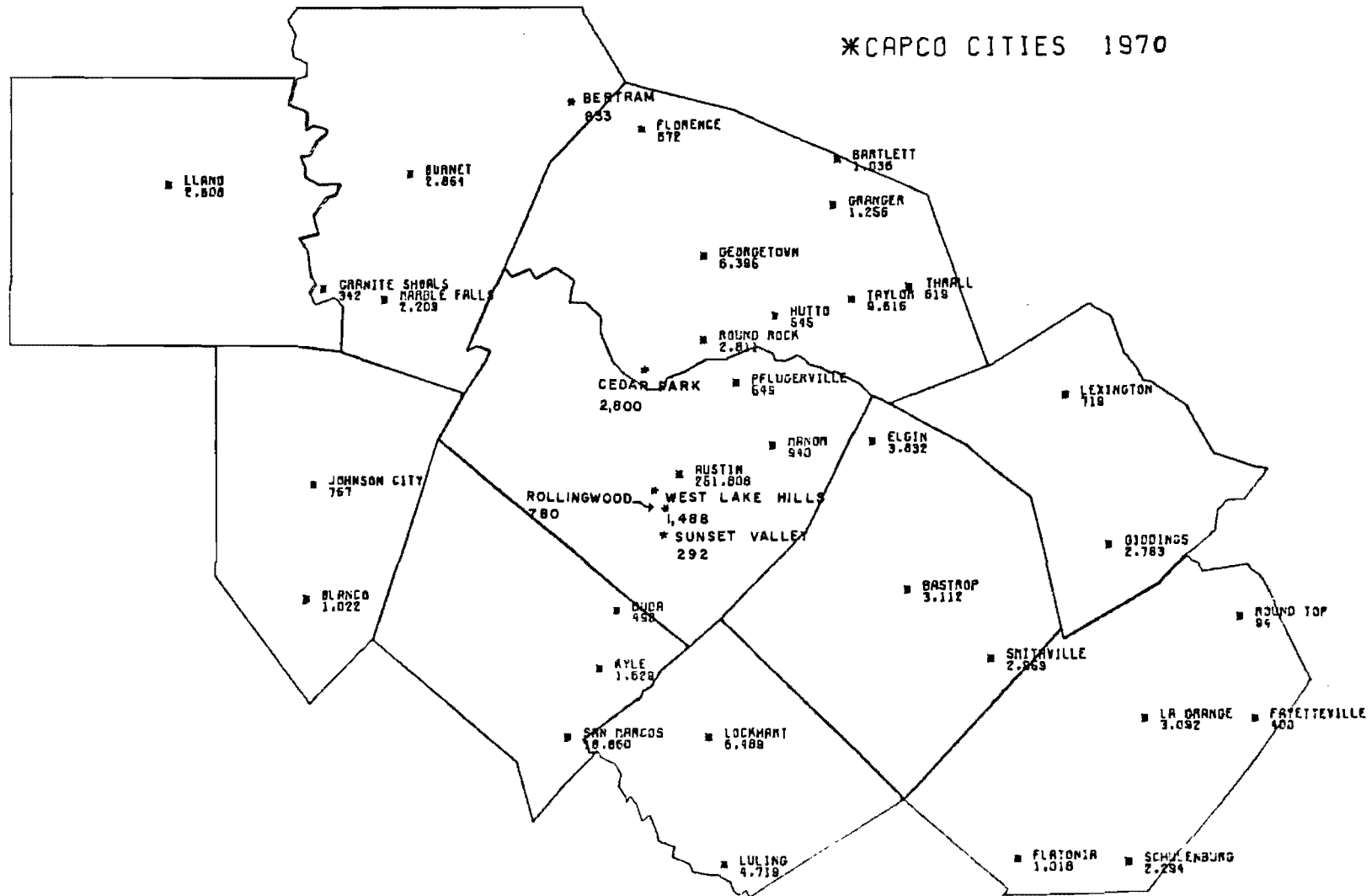
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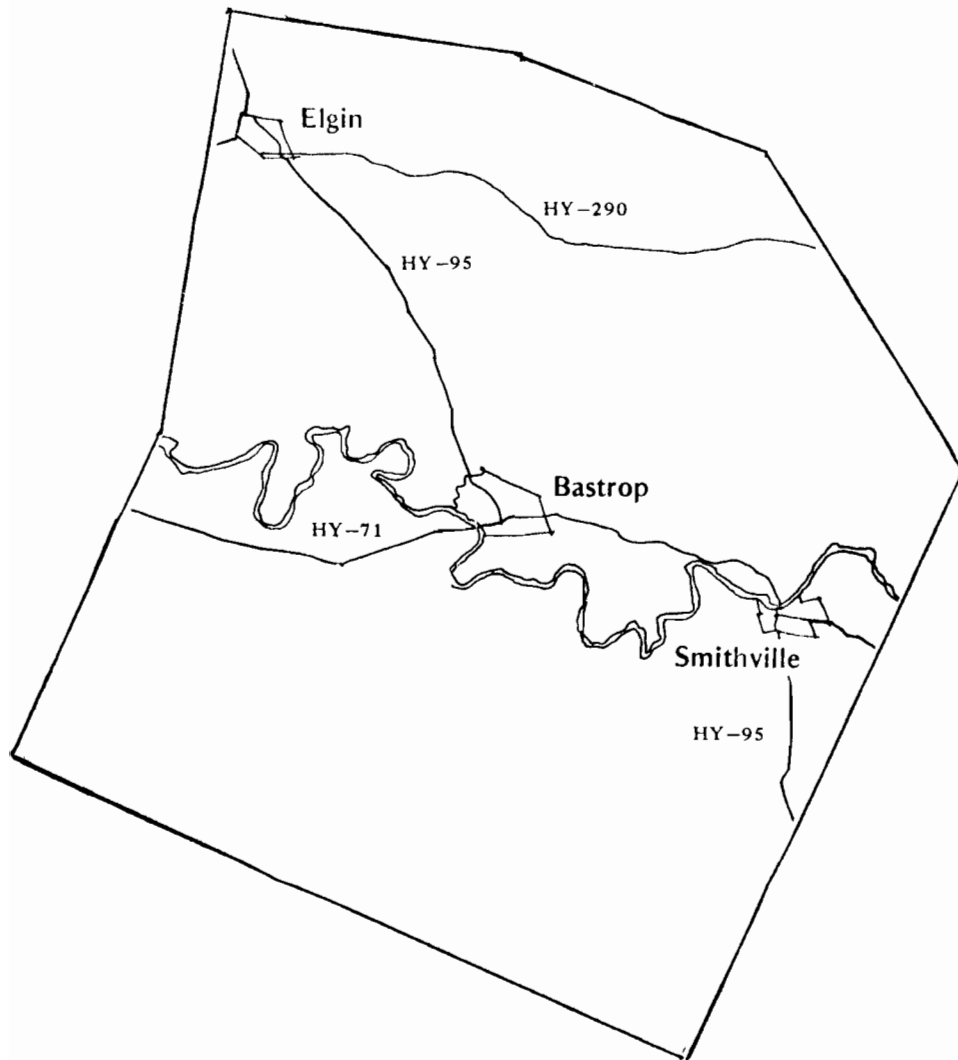
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<u>AUS</u>	<u>IZ</u>	<u>CDO</u>
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345	247	253
385	251	268
397	255	273
441 -2	258	285
444	259	295
451 -4	261	321
459	264	556
471 -2	266	746
474 -8	267	752
836 -7	272	768
892	276	783
926	282	839
928	288	847
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		863
		932



*CAPCO CITIES 1970

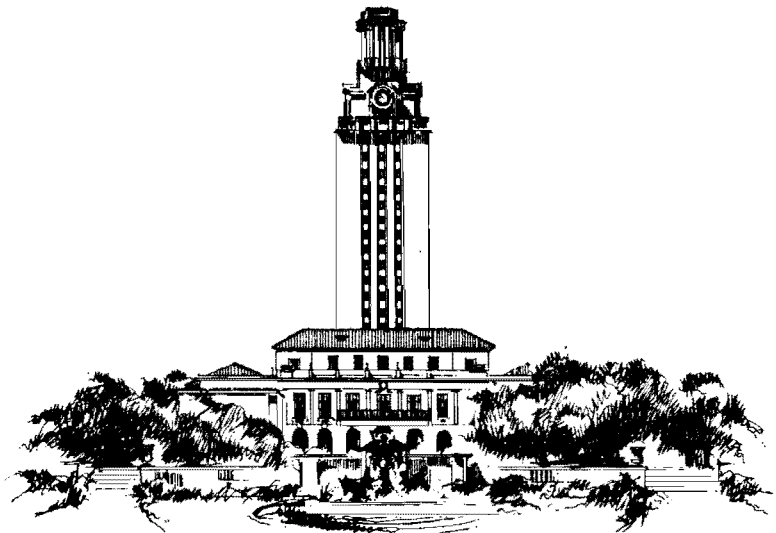




Map of Bastrop County



L021827



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THE UNIVERSITY OF TEXAS AT AUSTIN